

NURTURING WONDER AND IGNITING PASSION

Designs for a new school curriculum

NSW CURRICULUM REVIEW

April 2020



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NSW Education Standards Authority

NURTURING WONDER AND IGNITING PASSION

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NSW CURRICULUM REVIEW

Independent Review Lead

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PREFACE

In May 2018 the New South Wales (NSW) Government announced a comprehensive review of the school curriculum from Kindergarten to Year 12 to 'ensure that the NSW education system is properly preparing students for the challenges and opportunities of the 21st century'. The announced Review was described as the first major review of the entire NSW school curriculum since 1989. This report of the Review is based on statewide consultations and online submissions, including public feedback on an Interim Report released in 2019. The Review found strong community support for change and is recommending both short-term and long-term reforms that will deliver a new curriculum for NSW schools.

This report of the NSW Curriculum Review is based on a series of public consultations across NSW in 2018, more than 60 meetings with stakeholder groups, over 2000 online submissions, and in excess of 700 responses to reform directions identified in an Interim Report in 2019. The Review also studied recent curriculum reform initiatives in a number of other countries and reviewed evidence from cross-disciplinary research into human learning and the conditions that promote successful learning.

Throughout the Review process, people have been generous with their time and deeply thoughtful in providing advice. They have welcomed the opportunity and challenge to envision a curriculum appropriate to school education well into the future.

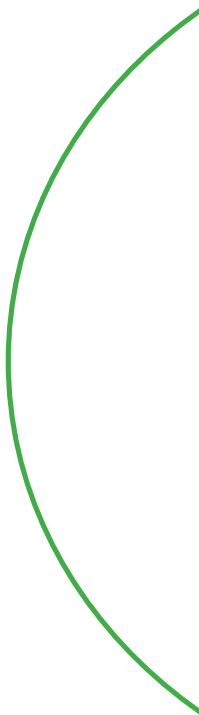
A strong and consistent message has been that change is required; the current curriculum arrangements are not the arrangements that will best serve children and young people of NSW into the future. Between 86 and 96 per cent of those responding online to the Interim Report's proposed reform directions expressed their support for significant change.

The Review has identified several key concerns that must be addressed in any new curriculum. First, the crowded nature of the current curriculum, including the amount of content some syllabuses expect teachers to cover, is not conducive to teaching in depth or helping students see the relevance of what they are learning. Second, the frequent separation of knowledge and skills, theory and application, and academic and vocational learning in the current curriculum, and the associated undervaluing of skills, do little to support students' understandings of how knowledge can be put to use or their development of skills in applying knowledge. Third, the timed nature of syllabuses that specify not only what should be taught, but also when it should be taught and how long should be spent teaching it, means some students are being required to move to the next year-level syllabus before mastering the content of the prior syllabus and so are falling increasingly behind in their learning over time. Other students are being required to mark time rather than advance to the more challenging material for which they are ready. Teachers require a more flexible curriculum to ensure every student is provided with well-targeted stretch challenges and so makes excellent ongoing progress.

Central to the proposed new curriculum is the development of 'new syllabuses' to address these three concerns. New syllabuses are proposed both for mandated subjects in the early and middle years of school and for redeveloped subjects in the senior years. These syllabuses are leaner in content; are more focused on developing deep understandings of disciplinary concepts and principles; provide better integration of theory and the application of theory; build students' skills in applying knowledge; and are more flexible in relation to the timing of teaching and learning to accommodate students' widely varying levels of attainment and learning needs.

Although significant time will be required to ensure effective implementation of the new curriculum, the Review is recommending that work be commenced immediately to deliver some elements of the new curriculum as soon as possible. It will be essential that other features of schooling, including assessment and reporting practices, are aligned with the principles and intentions of the new curriculum, and there will be a need for significant investment in capacity building, of both current and future teachers, to support schools' delivery of the new curriculum.

The Review has concluded that reform is urgent. There is clear evidence that many students are disengaging from school, slipping behind in their learning, and not making the progress or achieving the levels of which they are capable, with long-term costs to both individuals and NSW society. A redesigned curriculum is part of the solution to ensuring every young person learns successfully and is well prepared for further learning, life and work.



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SHORTENED FORMS

ACARA	Australian Curriculum, Assessment and Reporting Authority
AECG	NSW Aboriginal Education Consultative Group Inc.
AHISA	Association of Heads of Independent Schools of Australia
AITSL	Australian Institute for Teaching and School Leadership
ASQA	Australian Skills Quality Authority
ATAR	Australian Tertiary Admission Rank
BOSTES	Board of Studies Teaching & Educational Standards NSW
CCSP	Council of Catholic School Parents NSW/ACT
ESA	Education Services Australia
ETA	English Teachers Association
HSC	Higher School Certificate
HTA	History Teachers' Association of NSW
ICT	Information and Communication Technologies
IEU	Independent Education Union of Australia – NSW/ACT Branch
NAPLAN	National Assessment Program – Literacy and Numeracy
NCEE	US National Center on Education and the Economy
NESA	NSW Education Standards Authority
NSW	New South Wales
OECD	Organisation for Economic Co-operation and Development
PIRLS	Progress in International Reading Literacy Study
PISA	OECD's Programme for International Student Assessment
RoSA	Record of School Achievement
RTO	Registered Training Organisation
SACE	South Australian Certificate of Education
SBATs	School-based apprenticeships and traineeships
STEM	Science, Technology, Engineering and Mathematics
TAFE	Technical and Further Education
TIMSS	Trends in International Mathematics and Science Study
UAC	Universities Admissions Centre
VET	Vocational Education and Training
VETiS	VET in Schools

TERMS OF REFERENCE

The NSW Education Standards Authority (NESA) has been tasked with 'a review of the NSW curriculum to ensure it equips students to contribute to Australian society in the 21st century' (the Review).



The Review is conducted in a context of a high performing NSW Education system, which strives to meet the needs of a wide range of students, including those who are Aboriginal, or from culturally and linguistically diverse backgrounds, or living with disabilities.

The Review will undertake a comprehensive community engagement process to seek the diversity of views in the community, including the views of young people, parents, employers and those involved in the delivery of school education. These Terms of Reference have been developed following targeted stakeholder engagement.

The aim of the Review is to enhance the effectiveness of school education in NSW to:

- provide an education that engages and challenges every child and young person in learning, rewards them for effort and promotes high standards, and
- prepare each student with strong foundations of knowledge, capabilities and values to be lifelong learners, and to flourish in a world in which rapid technological advances are contributing to unprecedented economic and social change in unpredictable ways.

The Review will consider the strengths and weaknesses of the current NSW curriculum, its relationship to the Australian Curriculum and its accessibility to the diverse learners of the NSW community.

The Review, in developing its recommendations, should:

1. articulate the purposes of the school curriculum, including underpinning philosophies and principles
2. identify essential knowledge, skills and attributes as the common entitlement for all learners, ensuring parity of access to learning that is necessary for success, taking account of:
 - a. the evidence on how skills and attributes are acquired through knowledge-based disciplines
 - b. the extent of overcrowding in the curriculum
 - c. the appropriate scope for school community choices about content
3. explain how the curriculum could be redesigned and presented to better support teaching, learning, assessment and reporting, including by considering:
 - a. the desirability of identifying priorities for learning at different stages of schooling
 - b. the appropriate level of detail in curriculum documents
 - c. the breadth and depth of study
 - d. ways of improving every learner's transition into school and across the years of schooling
 - e. ways of enhancing the options and pathways for all students to further education and work
4. identify the implications of any new approach to curriculum design for:
 - a. assessment and reporting (including NAPLAN, the Record of School Achievement and the Higher School Certificate)
 - b. pedagogical practices and teacher workload
 - c. teacher preparation and ongoing professional learning
 - d. school organisation and regulation
 - e. relevant legislation
 - f. measuring the quality and impact of schooling.

The Review will have regard to:

- National policy developments and reports, including:
 - the *National Aboriginal and Torres Strait Islander Education Strategy 2015*¹, and the national *Closing the Gap* strategy
 - *Through Growth to Achievement: Report of the Review to Achieve Educational Excellence in Australian Schools*.² The Review will contribute appropriately to any related national processes
 - *Lifting Our Game: Report of the Review to Achieve Educational Excellence in Australian Schools through Early Childhood Interventions*³
 - Australia's Chief Scientist, Dr Alan Finkel's report *Optimising STEM industry-school partnerships: inspiring Australia's next generation*⁴
 - the *Independent Review into Regional, Rural and Remote Education* conducted by Emeritus Professor John Halsey⁵
 - the *Review of the Australian Curriculum: Final Report*.⁶
 - Obligations under the Disability Discrimination Act 1992⁷ and the Disability Standards for Education 2015⁸
 - The 2016 BOSTES Review⁹ (particularly in relation to the crowded curriculum) and the Stronger HSC Reforms¹⁰ introduced from 2017
- Any significant lessons to be drawn from other Australian jurisdictions including in their implementation of the Australian Curriculum, as well as perspectives from international jurisdictions where there have been recent reviews and curriculum revisions
- Corresponding work of the Australian Curriculum, Assessment and Reporting Authority (ACARA) to review and refine the Australian Curriculum, including international research.

¹ Education Council, *National Aboriginal and Torres Strait Islander Education Strategy 2015*, 2015, viewed 6 August 2019, <http://www.educationcouncil.edu.au/site/DefaultSite/filesystem/documents/ATSI%20documents/NATSL_EducationStrategy_v3.pdf>.

² Department of Education and Training 2018, *Through growth to achievement: report of the review to achieve educational excellence in Australian schools*, Australian Government, Canberra, viewed 25 July 2019, <<https://docs.education.gov.au/documents/through-growth-achievement-report-review-achieve-educational-excellenceaustralian-0>>.

³ S Pascoe & D Brennan, *Lifting our game: report of the review to achieve educational excellence in Australian schools through early childhood interventions*, Victorian Government, Melbourne, December 2017, viewed 6 August 2019, <<https://education.nsw.gov.au/early-childhood-education/whats-happening-in-the-early-childhood-education-sector/lifting-our-game-report/Lifting-Our-Game-Final-Report.pdf>>.

⁴ Education Services Australia, *Optimising STEM industry-school partnerships: inspiring Australia's next generation: final report April 2018*, 12 April 2018, viewed 6 August 2019, <<https://www.chiefscientist.gov.au/2018/05/optimising-stem-industry-school-partnerships-report-released/>>.

⁵ J Halsey, *Independent review into regional, rural and remote education: final report*, Department of Education and Training, January 2018, viewed 6 August 2019, <<https://docs.education.gov.au/documents/independent-review-regional-rural-and-remote-education-final-report>>.

⁶ Review of the Australian Curriculum, *Review of the Australian Curriculum: final report*, Australian Government Department of Education, 2014, viewed 6 August 2019, <<https://docs.education.gov.au/documents/review-australian-curriculum-final-report>>.

⁷ Cwlth, *Disability Discrimination Act 1992*, 1992, viewed 6 August 2019, <<https://www.legislation.gov.au/Series/C2004A04426>>.

⁸ Department of Education and Training, *Disability Standards for Education 2005 plus guidance notes*, 2005, viewed 6 August 2019, <<https://docs.education.gov.au/documents/disability-standards-education-2005>>.

⁹ W Loudon, L Paul & P Lambert, *Review of the Board of Studies, Teaching and Educational Standards: report of the independent panel*, NSW Government, 2016, viewed 6 August 2019, <<https://educationstandards.nsw.edu.au/wps/portal/nesa/about/news/news-stories/news-stories-detail/reviewing-the-board-of-studies-teaching-and-educational-standards>>.

¹⁰ Board of Studies Teaching & Educational Standards NSW (BOSTES), *Stronger HSC standards: blueprint*, n.d., viewed 6 August 2019, <<https://educationstandards.nsw.edu.au/wps/wcm/connect/d210fd41-8c61-4754-aa45-7476b9305b1d/stronger-hsc-standards-bostes-blueprint.pdf?MOD=AJPERES&CVID=>>>.

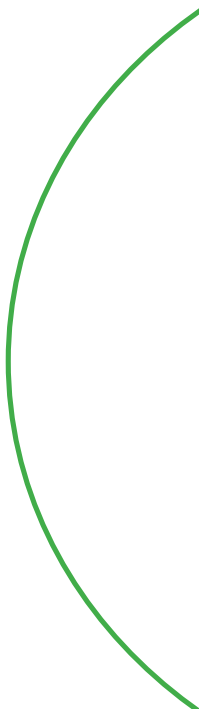
EXECUTIVE SUMMARY

This Review of the New South Wales school curriculum has concluded that change is required. The changes recommended by the Review are far-reaching and amount to the introduction of a new curriculum for NSW schools, from Kindergarten to Year 12. The syllabuses of this new curriculum (referred to as 'new syllabuses') are designed to ensure every student learns with understanding, builds skills in applying knowledge, and makes excellent ongoing progress in their learning. The goal is to provide every student, in each phase of their learning, with strong foundations for what comes next. Detailed planning, piloting and implementation of the new curriculum will be required over an extended period of time, possibly a decade, although some proposed changes should be introduced as a matter of priority. The long-term vision is for a curriculum that supports teachers to nurture wonder, ignite passion and provide every young person with knowledge, skills and attributes that will help prepare them for a lifetime of learning, meaningful adult employment and effective future citizenship.

Although the NSW school curriculum has served students well and continues to provide the foundations for a quality education, the Review was presented with strong evidence of the need for change. Broader changes in society, and particularly increasing globalisation and advances in technologies, have changed forever the world in which students live, including future employment possibilities. With a rapidly expanding range of activities now being performed by machines, occupations of the future will require people with levels of knowledge and skill beyond the capabilities of current and emerging technologies. The new and urgent challenge for schools and the school curriculum is to ensure that all students reach levels of attainment currently achieved by only some. This challenge is being taken seriously by some school systems internationally that recognise the risk of growing numbers of students being left unemployable and economically disadvantaged throughout their lives, with likely implications for increasing social inequalities and tensions.

However, by some indicators, current trends in student attainment in this state appear to be in the opposite direction. Although there is evidence of improvement in reading levels in primary schools (based on NAPLAN tests conducted between 2008 and 2018), the proportion of NSW 15 year olds meeting minimally acceptable standards of reading, mathematical and scientific literacy has been in steady decline (based on PISA assessments conducted between 2000 and 2018). New South Wales students slipped from being among the highest performers in the world in 2000 to being near the OECD average in 2018. In other words, while low-level skills are in declining demand in workplaces, the proportion of NSW 15 year olds achieving only low-level skills has been growing. Reforms to the content and structure of the curriculum, although only part of the solution, are essential in addressing this challenge.

Teachers who spoke with the Review made strong calls for change. They described many current syllabuses as overcrowded with content, impacting their ability to teach effectively. They commonly described being under time pressure to cover large numbers of syllabus 'dot points'. As a result, they experience difficulty in slowing down teaching and re-teaching to ensure students have learnt; they have limited time to teach core ideas in depth, including by providing opportunities for students to apply their learning in a range of contexts; and they often have insufficient time to build skills in knowledge application through student projects and problem-based activities. The crowded nature of many syllabuses, particularly in primary schools, but throughout the years of school, was described as encouraging superficial coverage of material rather than teaching for understanding, exploring relevance and meaning, and providing opportunities for students to transfer and apply what they learn.



Many submissions called for changes to give higher priority to skills development in the curriculum. Some argued for greater emphasis on '21st century skills', 'generic skills' or 'general capabilities', such as skills in using technologies, critical and creative thinking, problem solving, working with others, and communicating. Teachers described a tension between the development of skills of these kinds and the delivery of existing syllabuses, and saw a need to resolve this tension. Others expressed concern over the undervaluing of skills in the senior years of school, exacerbated by the current academic-vocational divide, and called for changes that would result in every subject in these years promoting both skills development and knowledge acquisition.

Another strong call from teachers was for a more flexible curriculum that would allow them to better respond to individual learning needs. Most (but not all) existing syllabuses were described as specifying not only what teachers are to teach, but also when they are to teach and how long they are to spend teaching it. This often constrains their ability to make professional judgements about what individual students are ready to learn and to adapt their teaching accordingly. Instead, teaching becomes a process of delivering the specified year-level syllabus, ensuring it is fully covered, and then assessing and grading each student on how well they have learnt what has been taught. The expectation that teachers will deliver the same content to all students within mandated (or recommended) hours means some students are being taught content for which they are not yet ready or require more time. As a result, these students struggle, tend to achieve low grades year after year, and sometimes fall further behind the longer they are in school. On the other hand, the most advanced students – who typically begin each school year five or six years ahead of the least advanced students in the year level – often are not adequately challenged by the content of year-level syllabuses. There was concern that many of these students are not being stretched to the levels of which they are capable.

It seems likely that the crowded nature of many syllabuses, the undervaluing of skills in the curriculum, and constraints on teachers' abilities to address individual learning needs contribute to many students becoming disengaged from school. For too many students, school learning is a process of memorising facts and routines with limited conceptual understanding. They often have few opportunities to see and appreciate how what they are learning can be transferred and applied or to build practical skills in applying knowledge. And many are being given repeated messages that they are underperforming against year-level expectations, resulting in disengagement and some students falling even further behind.

Evidence from international research into learning – which also informed the Review's deliberations and shaped its recommendations – reinforces the importance of developing students' deep understandings of subject matter and their appreciation of the relevance and potential application of what they are taught. Other research highlights the important role positive self-concept plays in successful learning, and the possibility of promoting this by assisting students to see the progress they are making. And it is now well established through research that learning is maximised when learners are given learning opportunities appropriate to the points they have reached in their learning and at an appropriate level of stretch challenge.

The Review has concluded that significant change is required if the school curriculum is to address these concerns and provide every young person with the knowledge, skills and attributes they will require for further learning, life and work. The recommended changes are far-reaching and amount to the introduction of a new curriculum for NSW schools, from Kindergarten to Year 12. Central to this new curriculum is a set of new syllabuses that are leaner in content; are more focused on developing deep understandings of disciplinary concepts and principles; provide better integration of theory and the application of theory; build students' skills in applying knowledge; and are more flexible in relation to the timing of teaching and learning to accommodate students' widely varying levels of attainment and learning needs. In the senior years of school, a smaller number of rigorous, high quality HSC subjects is envisaged, achieved by combining and consolidating existing subjects. It is recommended that the core content of these new syllabuses be developed with reference to the Australian Curriculum and that, as they are developed, new syllabuses replace the existing syllabuses of the NSW curriculum.

The new curriculum

The new curriculum being proposed by the Review is based on the introduction of 'new syllabuses' for all areas of learning throughout the years of school. These new syllabuses are designed to address concerns raised with the Review about the need to prioritise depth rather than breadth of learning, to better integrate knowledge and skills, and to provide greater flexibility for teachers to respond to the learning needs of individual learners so that every student makes excellent ongoing progress in their learning. The development and introduction of these new syllabuses could take up to a decade.

Figure 1 summarises the key features of new syllabuses and the issues they are designed to address. These features apply to all subjects of the mandated curriculum in the early and middle years of school, as well as to all subjects in the senior years.

The aim of the new curriculum is to ensure every student	EXISTING SYLLABUSES	NEW SYLLABUSES
learns with understanding	<p>Overcrowded</p> <p>Teachers say overcrowded syllabuses make it difficult to teach important content in depth.</p> <p>Many students lack the depth of understanding required to apply subject learning in new and unfamiliar contexts – as evidenced by declining performances in PISA.</p>	<p>Refocused</p> <p>Teaching and learning are focused on developing students' deep understandings of important concepts, principles and methods in each subject. Factual and procedural knowledge remain essential, but the syllabuses of the new curriculum prioritise depth rather than breadth of learning.</p>
builds skills in applying knowledge	<p>Separation of knowledge and skills</p> <p>Existing syllabuses undervalue and underdevelop skills in applying knowledge. This is reflected in the content of most tests and examinations; the separation of 'general capabilities' from subject knowledge; and the separation of knowledge-based and skills-based learning in the senior years.</p>	<p>Integration of knowledge and skills</p> <p>Learning in every subject is a mix of theory and application, with no subject focused only on knowledge or only on skills. New syllabuses develop skills in applying knowledge (for example, critical and creative thinking) and provide opportunities for students to develop and demonstrate such skills.</p>
makes excellent ongoing progress	<p>Progress based on time</p> <p>Existing syllabuses are time-limited. Many students are forced to move to the next year-level syllabus before they have mastered the current syllabus, and so fall increasingly far behind over time. Many other students ready for the next syllabus are required to mark time and are not adequately challenged.</p>	<p>Progress based on attainment</p> <p>New syllabuses are untimed. They do not specify when every student must commence, or how long they have to learn, each syllabus. Students progress to the next syllabus once they have mastered the prior syllabus. Students who require more time have it; students ready to advance are able to do so.</p>

Figure 1 Key features of 'new syllabuses'

Learning with understanding

A feature of all new syllabuses is their strong focus on ensuring students learn with understanding. This is achieved by giving greater priority to fundamental concepts and principles in each subject and by providing opportunities for students to see how these concepts and principles can be applied in a range of meaningful contexts. In many subjects, this means emphasising depth rather than breadth of learning. Rather than attempting to cover large amounts of factual and procedural content, new syllabuses focus on a smaller set of core factual knowledge, concepts and principles and are designed to develop increasingly deep understandings of these over time.

The objectives here are to: focus new syllabuses on what is essential to each subject; address concerns about 'overcrowded' syllabuses that require large amounts of material to be covered in limited amounts of time, thereby encouraging more superficial forms of teaching and learning; provide opportunities for students to develop deeper understandings of content through the transfer and application of their learning to a range of situations and problems; and enhance engagement and enjoyment of learning by keeping rote learning to a minimum and assisting students to see the meaning and relevance of what they are learning.

This feature of new syllabuses requires the identification of core content in each subject and the design of teaching and learning around this core. The prioritised factual and procedural knowledge is knowledge required for further learning in a subject. The prioritised concepts and principles are those around which knowledge is organised and that are developed and understood in increasing depth over time. The sequencing of content is informed by theoretical and empirical research into how learning occurs in each subject.

- 1. Design new syllabuses for each subject, including subjects of the senior years, to reduce the volume of mandated content where appropriate and to prioritise the learning of core facts, concepts and principles.**
 - 1.1 In each subject of the new curriculum, identify essential facts, concepts and principles, the understanding of which is developed in increasing depth over time, and where required, use this to identify content that is more peripheral and could be removed.
 - 1.2 Decide how this core content is to be sequenced through new syllabuses, informed by evidence of how increasingly deep knowledge and understandings in a subject commonly unfold and are best developed over time.

Skills in applying knowledge

The second feature of all new syllabuses is their design to give greater attention to skills in using knowledge. This feature applies both to learning areas of the common curriculum that all students undertake and also to subjects that extend and build on subjects of the common curriculum in the later years of school.

New syllabuses are designed not only to develop increasingly sophisticated knowledge and deeper understanding of an area of learning, but also skills in applying that knowledge. No subject is focused solely on developing knowledge or solely on developing skills; theory and the application of theory are seen as intertwined and essential features of every subject.

Skills in applying knowledge include subject-specific skills, but also skills in using technologies, sourcing and analysing information, critical and creative thinking, collaborating, and communicating. New syllabuses specify how students' skills in applying knowledge are to be developed in parallel with their advancing knowledge and understanding of each subject. Rather than being taught or assessed separately from subjects, such skills are incorporated into new syllabuses and are seen as an integral part of developing competence in each subject.

The development and demonstration of skills depend on opportunities for students to put their subject knowledge and understandings to work, for example, through practical applications, problem solving activities or investigative projects. In these ways, students build and extend their subject knowledge and also develop an important range of skills in using that knowledge.

- 2. Design new syllabuses not only to develop increasingly sophisticated knowledge and deeper understandings of a subject, but also skills in applying that knowledge.**
 - 2.1 Make explicit in new syllabuses for every subject that skills in applying knowledge are part of the intended learning, and show how these skills are to be developed over time. These skills include subject-specific skills, but also skills in using technologies, sourcing and analysing information, critical and creative thinking, collaborating and communicating.

Excellent ongoing progress

The third feature of all new syllabuses is their design to ensure every student makes excellent ongoing progress in their learning. This feature is a response to the observation that existing syllabuses are time-limited, meaning that many students are required to move to the next year-level syllabus before they have mastered the current syllabus. These students often fall increasingly far behind with each year of school and fail to make the progress they otherwise could. Many other students are not adequately challenged by their current syllabus and are ready for the next. These students often mark time and also do not make the progress they are capable of making.

New syllabuses are untimed. They do not specify when every student must commence, or how long they have to learn, any given syllabus. Students progress to the next syllabus once they have mastered the prior syllabus. Students who require more time have it; students ready to advance are able to do so. Teachers determine when students have achieved a syllabus and are ready to move to the next.

A consequence is that students in the same year of school may not all be working on the same new syllabus at the same time. The underlying principle is that learning is maximised when learners are presented with appropriately challenging material, rather than being under-challenged by what they already know or over-challenged by what they are not yet ready to learn.

3. **Design new syllabuses that do not specify when every student must commence, or how long they have to learn, the content of each syllabus.**
 - 3.1 Make new syllabuses untimed, with students progressing to the next syllabus once they have mastered the prior syllabus. Students who require more time should have it; students ready to advance should be able to do so.
 - 3.2 Specify what students are expected to know, understand and be able to do as a result of being taught each syllabus in a subject and illustrate this standard with samples of student responses and work.

Building strong foundations

The primary objective of the new curriculum is to provide every student, in each phase of learning, with strong foundations for what comes next. The ultimate aim is to ensure every student leaves school well prepared for a lifetime of ongoing learning and informed and active citizenship and with knowledge, skills and attributes that will help equip them for meaningful work and satisfying careers. Underpinning this objective is recognition that there are currently significant costs to individuals and society when students fall behind in their learning and leave school with inadequate levels of attainment.

As well as introducing new syllabuses for every subject to give greater priority to learning with understanding, building skills in applying knowledge, and ensuring every student makes excellent ongoing progress in their learning, the new curriculum establishes a number of priorities for teaching and learning in each phase of school.

The early years

The early years of school are crucial in establishing foundations for future learning success. By the time they commence school, children are at widely varying points in their learning and development. They have very different levels of social and emotional maturity, language skills, cognitive development and psychomotor development. The challenge in these early years is to ensure that every child, especially those with developmental delays and from disadvantaged backgrounds, gets off to a good start and builds the foundations for subsequent success at school.

The new curriculum makes this a priority. It does this first by giving precedence to foundational aspects of children's learning and development: their social and emotional development, oral language skills, early reading skills, and early mathematics knowledge and skills. These are prioritised over all other areas of the school curriculum, particularly for children who are less advanced in these aspects of their development. The new curriculum does not propose that children spend inordinate amounts of time on reading and mathematics to the exclusion of other aspects of learning, including physical activity, play, music and art. However, given their importance as foundations for future success at school, these prioritised areas of learning are singled out in the new curriculum for special attention, particularly for children who require it.

Second, the new curriculum recognises that teachers require flexibility to respond to children's widely varying levels of development and learning needs. A key to ensuring every child establishes strong foundations in the early years is to identify the points they have reached in their learning – for example, the extent to which they have mastered early reading skills – and to tailor teaching accordingly. Rather than assuming every child in the same year of school is ready for the same year-level syllabus, the new curriculum is redesigned to support teachers to identify the stages individuals have reached in their learning so that they can respond flexibly to their different learning needs. This includes ensuring more advanced children are challenged to the levels of which they are capable.

- 4. In the early years of school, give priority to providing every child with solid foundations in the basics, especially oral language development, early reading and writing skills and early mathematics knowledge and skills.**
- 4.1 Make explicit in the curriculum that oral language development, early reading and writing skills and early mathematics skills are top priorities in the early years of school, particularly for children who are less advanced in these areas, and that these take precedence over other aspects of learning.
- 4.2 Develop a detailed and explicit curriculum for the teaching of reading as part of new syllabuses for the subject English, structured to assist teachers to establish and diagnose where individual children are in their reading development, and accompanied by evidence-based teaching advice.
- 4.3 Structure the early mathematics curriculum to support teachers to establish the points children have reached in their mathematics learning, including by diagnosing conceptual gaps and skills deficits, and provide accompanying evidence-based teaching advice as part of new syllabuses in mathematics.

The middle years

During the middle years of school every student studies a set of mandated subjects. These subjects are intended to build students' understandings of themselves, society and the wider world, and to provide exposure to important bodies of human knowledge. The subjects of this common curriculum provide essential foundations for learning in the later years of school and for life more generally.

The new curriculum maintains this existing set of subjects. However, many students during these middle years currently do not achieve intended levels of learning in mandated subjects. The OECD has identified minimally acceptable levels of attainment in reading, mathematics and science by 15 years of age. Between one in five and one in four students in NSW do not reach these levels, and these percentages have been increasing steadily over the past two decades. For these students, the common curriculum of the middle years does not build strong foundations for life or further learning at school.

The new curriculum is designed to address this challenge. It does this by setting clear standards that every student is expected to achieve in mandated subjects by the completion of their schooling – something that does not exist currently – and by providing teachers and parents/carers with an improved basis for monitoring students' long-term progress and for identifying students who are not on track to achieve these standards.

In addition, the new curriculum requires every student to commence learning a second language during their primary years. The goal of language learning in the new curriculum is to provide every student with some knowledge of a second language and to lay the foundations for an increased number of students to pursue advanced levels of proficiency, particularly in languages of the region.

The curriculum also expects every student during the middle years of school to develop a common understanding and appreciation of Aboriginal cultures and histories. These are seen as essential foundations for informed adult citizenship in Australia.

5. **In the middle years of school, give priority to providing every student with challenging learning material appropriate to their current level of attainment in the expectation that they meet (and ideally exceed) a minimally acceptable standard in each mandated subject by the completion of school.**
 - 5.1 Maintain the existing set of mandated subjects; for each subject define the minimum level of attainment every student should achieve by the completion of school; and provide teachers and parents/carers with a way of monitoring whether individuals are on track to achieve that standard.
 - 5.2 Require every student to commence learning a second language during their primary years, making use of technology where possible.
 - 5.3 Develop a curriculum that specifies what every student should know and understand about Aboriginal cultures and histories, and incorporate this curriculum into Human Society and its Environment.

The later years

During the later years of school, the focus of student learning currently is on preparation for particular post-school destinations. For most students, this means working to achieve entry to a desired higher education course. For others, it means preparing for work. During these years, students undertake programs of study that reflect their aspirations, interests and perceived capabilities.

There is a strong divide in these years between academic and vocational learning. These two kinds of preparation are based on different intended outcomes, curricular approaches, pedagogies, and forms of assessment. In one case, the focus is primarily on acquiring knowledge to be tested in final examinations which determine a student's Australian Tertiary Admission Rank (ATAR) and thus likelihood of being selected into a university course of choice. In the other, the focus is primarily on acquiring skills that must be demonstrated and confirmed in practice and that usually are determined by the requirements of externally provided vocational qualifications. There is also a clear hierarchy; most students and parents see the academic pathway as preferable to the vocational pathway, which tends to be viewed as more appropriate for 'less able' students.

It is not obvious that these existing arrangements provide the strong foundations that every student now requires for further learning, adult life and the world of work. Both provide relatively narrow preparations in their own way, either driven by the needs of universities or by industry bodies. They also promote artificial and unhelpful distinctions between knowledge and skills, theory and practice, and academic and vocational learning. The new curriculum aims to ensure that every student in the later years of school develops advanced knowledge in chosen areas of study, skills in applying that knowledge, and attributes to equip them for life and future careers.

Central to the new curriculum in the later years is a limited number of rigorous, high quality HSC subjects. A smaller number of subjects is envisaged, achieved by combining and consolidating earlier subjects. Each new subject integrates theory and the application of theory. The mix of theory and application varies from subject to subject, but advanced knowledge and advanced skills are features of every subject. Vocational learning is not quarantined to a set of vocational education and training (VET) subjects, but is seen as relevant to every student and area of learning. Skills such as problem solving, working in teams, collaborating, communicating, and thinking critically and creatively are promoted in all subjects and are also developed and demonstrated through a major investigative project that every student undertakes.

To minimise the current academic-vocational dichotomy and to support student pathways from school to post-school destinations, the new curriculum introduces a new framework for learning in the senior years. This framework consists of a set of new 'learning areas' which function as focal points for schools' relationships with relevant industries and post-school providers, as well as playing a role in developing students' understandings of career opportunities, courses and pathways. Figure 2 shows what these new learning areas might look like. Every subject in the senior years is assigned to one of these areas.

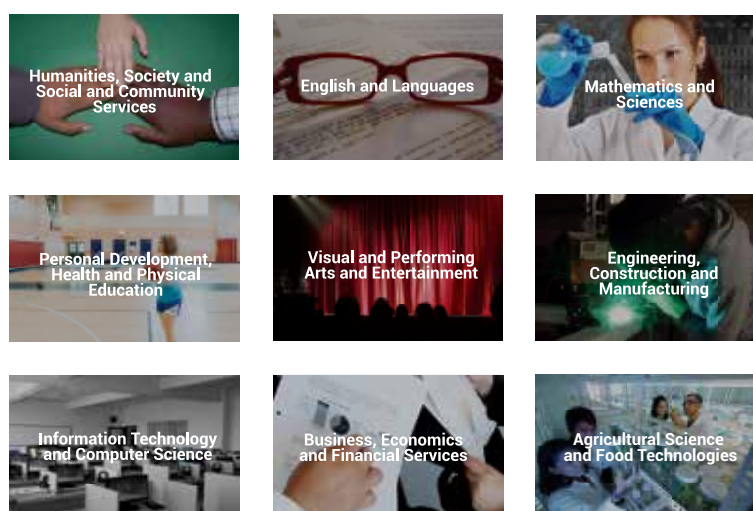


Figure 2 A new framework for learning in the senior years of school

- 6. In the later years of school, give priority to providing every student with opportunities to pursue personal interests and strengths through rigorous, specialised subjects, each of which builds solid theoretical foundations, provides opportunities to transfer and apply knowledge, and develops skills in the practical application of subject learning.**
 - 6.1 Eliminate the current bifurcation of learning in the later years by developing over time a new set of HSC subjects, each of which involves rigorous, high-quality learning that integrates knowledge and the practical application of knowledge.
 - 6.2 Replace the existing learning areas in the later years with a newly defined set, allocate all future HSC subjects to these areas and promote them as focal points for schools' connections with relevant industries and post-school providers and pathway and career advice.
 - 6.3 Require every student to undertake a major investigative project in a subject of their choosing, with common assessment criteria, moderation of teacher assessments, and performances forming part of a student's HSC results.
 - 6.4 Establish a taskforce comprising representatives of the higher education sector, the school sector and the Universities Admissions Centre, to investigate the feasibility of not calculating and reporting the Australian Tertiary Admission Rank (ATAR).

Stakeholder engagement

The implementation of the new curriculum will need to occur over a number of years to allow new syllabuses and curriculum features to be designed, developed and piloted in schools. Stakeholder groups, particularly teachers, should be closely involved in all phases of implementation. This will be important to ensure new arrangements are introduced in ways that best support the work of teachers and schools, as well as achieve their broader educational purposes. The new curriculum should be developed collaboratively and 'owned' by the widest possible range of NSW stakeholders.

It will be essential that those leading the implementation of the new curriculum communicate clearly the key intentions, guiding principles and underpinning evidence base for the new curriculum. This includes explaining the urgency of change. It will be equally important to communicate what is not intended. Although feedback on the Review's Interim Report provided strong support for its proposed reform directions, it was often made clear that this support was contingent on how the Review's intentions were implemented in practice.

- 7. Involve stakeholder groups, especially teachers, in all implementation phases of the new curriculum.**
- 7.1 Consult and actively involve all relevant stakeholder groups in the planning, development and pilot testing of new curriculum arrangements.
- 7.2 Implement a communications plan to explain the urgency of curriculum reform and the key intentions, guiding principles and underpinning evidence base for the new curriculum, including by clarifying what is not intended.

Creating enabling conditions

The successful introduction of the new curriculum will depend on the creation of a number of enabling conditions, including increased time for teachers to focus on the priorities of the new curriculum; teaching, assessment and reporting practices aligned with the principles and intentions of the new curriculum; and professional capacity building to support schools' delivery of the new curriculum.

Time for teaching and learning

Many teachers who spoke with the Review described being under time pressure. Some commented that this made it difficult to teach important content in depth. Teachers described experiencing time pressure from a number of directions. Much of it arose from the amount of content in existing syllabuses. Some reported that the volume of content meant that they moved quickly from one 'dot point' to the next in an effort to cover everything, often skating across the surface of the curriculum in the process. There were also concerns about extra requirements imposed on schools by governments and school systems. Submissions to the Review listed a variety of topics that have been added to the work of schools in recent years in response to specific events, pressure from lobby groups, and government concerns about health and social issues not being addressed elsewhere. Schools pointed out that these issues were added with little or no consideration of their impact on the rest of the curriculum or the workload of schools. And a range of other recent developments were considered to have reduced teachers' time to teach the curriculum, including external compliance requirements. There were numerous references to 'box ticking' and paperwork now required of teachers. These additional demands on teachers' time will need to be addressed to maximise the time available to teach the new curriculum.

- 8. Review current external demands on teachers' and school leaders' time in an effort to maximise the time available for teaching, learning and instructional leadership.**
- 8.1 Review recent requests that schools add extra-curricular issues and topics to the school curriculum to determine whether all are still necessary, and review protocols for adding such issues and topics in the future.
- 8.2 Review current paperwork and compliance requirements of teachers and school leaders with a view to reducing the time currently spent on such activities. This review should be undertaken by NESAs and each school sector.

An aligned learning 'system'

The successful introduction of the new curriculum also will depend on changes to other aspects of schooling to bring them into alignment with the principles and intentions of the new curriculum. These other aspects include, but are not limited to, approaches to classroom teaching, assessment and reporting, as well as broader approaches to improvement, including professional development and networking, initial teacher education, performance monitoring and accountability. The new curriculum is envisaged as part of an integrated learning 'system' in which the components of the system are mutually supportive and aligned with the principles that underpin the new curriculum. In particular, they need to reflect the new curriculum's focus on promoting learning with understanding, building skills in applying knowledge, establishing and understanding where individuals are in their learning, and targeting individual learning needs with evidence-based teaching.

Because tests, examinations and other assessment processes have a significant influence in directing teacher and student effort, it is particularly important that these are closely aligned with the intentions of the new curriculum. The new curriculum's focus on learning with understanding means that assessment processes should value and provide information about how well students understand core concepts, principles and ways of thinking and working in a subject. The new curriculum's focus on integrating knowledge and skills means that assessments designed solely or primarily to test students' mastery of a body of knowledge or a checklist of skills provide an incomplete picture of student learning. And the new curriculum's focus on ensuring every student makes excellent ongoing progress in their learning requires assessments capable of establishing where students are in their learning, providing feedback to guide next steps, and monitoring long-term learning progress.

- 9. Work to ensure all components of the learning system – including professional capacity building, assessment and reporting processes, and broader improvement efforts – are aligned with the principles and intentions of the new curriculum.**
 - 9.1 Build a coherent system of support for the new curriculum's goals to promote learning with understanding, to build skills in applying knowledge, and to assist teachers to establish where students are in their learning so that individual needs can be addressed with appropriately targeted, evidence-based teaching.
 - 9.2 In assessing student learning, give greater priority to students' understanding of core facts, concepts and principles, ability to apply these understandings in relevant settings, and skills in knowledge application.
 - 9.3 Develop, implement and promote assessment and reporting practices to establish the points individuals have reached in their learning, to provide diagnostic feedback to support further learning, and to monitor students' long-term learning progress.

Professional capacity building

The successful implementation of the new curriculum depends on teachers understanding its intentions and having the requisite professional knowledge and skills for implementation. Core to the new curriculum is its view of teaching as the process of establishing where students are in their learning and then ensuring individuals are taught new syllabuses appropriate to their current levels of attainment. Initial teacher education programs and ongoing professional learning should be based on recognition that teaching, at its heart, is about understanding where learners are in their learning, including by identifying skills gaps and misunderstandings, and providing targeted teaching that challenges and extends learners to higher levels of attainment. And, having established where individuals are in their learning, teachers need an understanding of effective, evidence-based teaching strategies and interventions.

- 10. Invest in professional capacity building to support the implementation of the new curriculum.**
 - 10.1 Promote an understanding of teaching as the process of first establishing where students are in their learning and then providing stretch learning challenges appropriate to individuals' current levels of attainment.
 - 10.2 Develop and deliver professional learning to build teachers' skills in assessing and diagnosing student learning and their knowledge of effective, evidence-based teaching strategies.

Timeline for introduction

Work should be commenced as soon as possible on the development of new syllabuses for English and Mathematics in the early and middle years of school. It is proposed that syllabuses for these two learning areas be developed in parallel, with syllabuses for the early years being available after two years of development. The staged design, development, piloting and introduction of all syllabuses in English and Mathematics will require six years. The Review has proposed a timeline for developing, finalising and introducing new syllabuses (Figure 3). If possible, new syllabuses should be developed in consultation with the Australian Curriculum Assessment and Reporting Authority as it redevelops the Australian Curriculum.

Work to develop syllabuses for Science and Human Society and its Environment will commence one year later than syllabuses for English and Mathematics, and for other key learning areas, one year after that.

New syllabuses in Human Society and its Environment should incorporate an explicit curriculum in Aboriginal cultures and histories and, in the first two years of planning the new curriculum, work should be commenced on scoping and confirming technology-based resources to support second language learning in primary schools.

In parallel with work to develop new syllabuses for the early and middle years of school, work should be commenced as soon as possible on the planning and development of new syllabuses for the senior years of school. This work should commence with the development of a new framework for learning in the senior years, consisting of a set of newly defined 'learning areas', with every existing subject then being allocated to one of these areas. Consideration should be given to how these new learning areas can serve as focal points for building stronger connections between schools and post-school education and training providers and relevant industries, and also for developing students' understandings of career possibilities and pathways into those careers.

NESA should then begin a process of reviewing subjects within each new learning area with a view to designing a set of future HSC subjects, each of which integrates knowledge and skills, and theory and application. A key task will be to consider how learning in each subject might be modularised to enable progress in the subject to be assessed and recognised, and to provide students with more flexibility to choose which and how many modules they complete. At least a decade may be required to develop and introduce the entire set of new HSC subjects. The Review also has proposed a timeline for the development of new HSC syllabuses (Figure 4).

In the first two years of planning the new curriculum, specifications should be developed for the major investigative project recommended by the Review. Key tasks will be to decide on the size of the project (anticipated number of hours) and the essential features and requirements of the project.

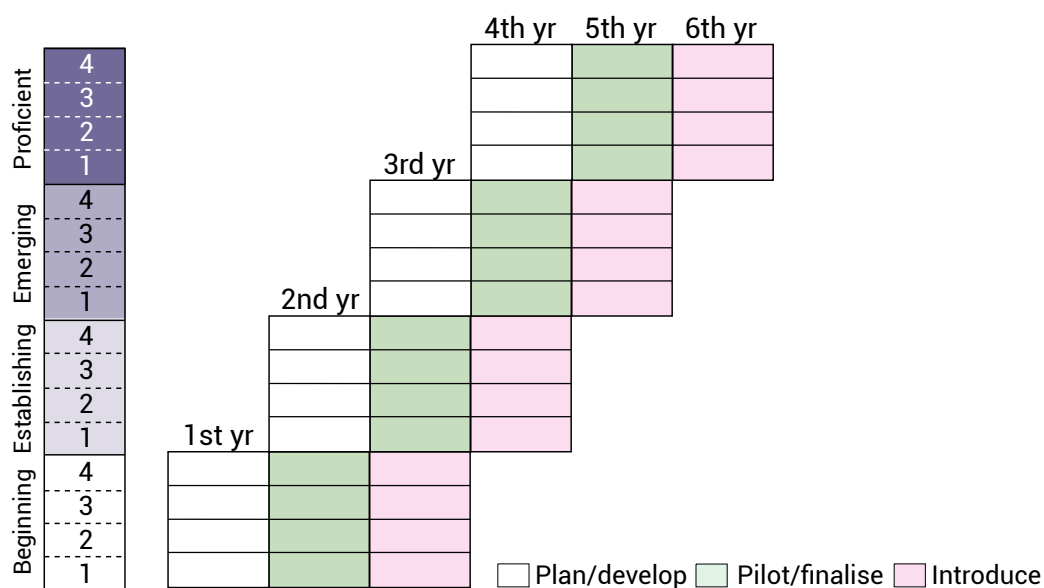


Figure 3 Timeline for developing, finalising and introducing new syllabuses

1st yr	2nd yr	3rd yr	4th yr	5th yr	6th yr	7th yr
Define a set of new learning areas. Begin exploring how these will provide focal points for student pathways.	Within each newly defined learning area, plan and design a set of rigorous, high-quality future HSC subjects, each of which integrates theory and the application of theory.		Develop each new subject, focusing on core knowledge, skills and conceptual understandings; the integration of theory and practice; and the development of students' skills in applying knowledge. Design the subject as a set of modules that enable choice and the assessment and recognition of student progress.		Pilot the new subject in schools and finalise its details, including assessment processes.	Introduce the new subject into schools.

Figure 4 Timeline for developing, finalising and introducing new syllabuses in the senior years

1. THE CONTEXT

Although there have been several major reviews of schooling arrangements and the school curriculum in NSW over recent decades, many aspects of current arrangements have their origins in the recommendations of the Wyndham Committee report of 1957. The Wyndham recommendations included the automatic transition of all students from primary to secondary school; the provision of a 'core' curriculum with increasing electives across the first four years of secondary school; the possibility of students undertaking courses leading to a Higher School Certificate (HSC) examination, the type and content of which 'should be such as to make it acceptable as a test for university matriculation'; and the establishment of an independent board with authority for the development of HSC courses, the conduct of HSC examinations, and the issuing of certificates.

The world in which schools now operate would be largely unrecognisable to members of the Wyndham Committee. It would barely be recognisable to members of the Carrick Committee who reported on their review of NSW schooling in 1989. Advances in globalisation, communication, and access to information, and fundamental changes in Australian society and many of its institutions have changed forever the contexts in which schools work, the challenges and opportunities they face, and the students who attend them. This Review commences with a brief look at some aspects of the environment in which NSW schools now operate and possible implications for the school curriculum.

The evolution of schooling

The Review has adopted a long-term perspective. From the outset, the task has been interpreted not so much as reviewing and suggesting changes to current syllabuses or making recommendations about operational matters for which NESA already has well-established decision-making processes, as developing possible design features for a future school curriculum. The focus of the Review has been on understanding perceived strengths and weaknesses of the current curriculum; exploring community aspirations for schooling in the future; and proposing broad-brush features of a curriculum that could well require a decade to plan and establish. This is not to say that immediate changes may not be required to existing syllabuses, but the primary goal of the Review has been to develop a long-term vision for the curriculum in NSW.

In adopting this approach, the Review has recognised that existing curriculum arrangements are the result of decisions made over many decades. An attempt has been made to look forward, but also backward to understand the intentions and motivations that produced the current curriculum. This has been instructive in revealing recurring themes and issues and in understanding past curriculum reform efforts, both successful and unsuccessful.¹¹

Examples of recurring themes can be found in the ways in which the various phases of schooling have evolved in NSW. Throughout the history of the state, there has been steadily growing demand for higher levels of education as more of the population has sought access first to primary schooling, then lower secondary schooling, then senior secondary schooling, then tertiary education. The expansion of these educational phases has followed broadly similar patterns.

At first, only a small percentage of the age cohort has participated in any given phase. These students are drawn mainly from a social and/or academic elite, with entry being restricted either to families who can afford it or to students who meet entry requirements, usually through an entrance examination.

¹¹ For a review of the history of school reform efforts in New South Wales see J Hughes & P Brock, *Reform and resistance in NSW public education: six attempts at major reform, 1905-1995*, NSW Department of Education and Training, Sydney, 2008.

This select group of students forms a core of individuals being prepared for professional and leadership positions in society, typically through a university education. A relatively small number of schools deliver a curriculum to these students which is strongly academic in focus.

Then, as student demand for the phase grows, the government becomes increasingly involved in meeting this growing demand. This includes attempting to cater for the 'non-academic' students now wishing to participate in the phase, possibly by introducing separate institutions, courses or qualifications for students not expected to continue beyond the phase. Government fees, if they existed, are abolished and the entrance examination to the phase is used not so much to control entry as to allocate students to institutions and courses. An exit qualification from the phase is introduced by government, possibly replacing an earlier university-provided qualification.

Finally, as almost the entire age cohort participates in the phase, student participation is made compulsory. If an entrance examination to the phase existed (possibly an exit examination from the prior phase), its significance is now greatly reduced and it eventually is abolished. With near-universal participation, earlier differentiation is replaced by attempts to identify a common core of learning for the entire student cohort, and separate qualifications are merged into a common qualification for all students. And, as an increasing percentage of students proceed to the next educational phase, the exit credential decreases in significance as a selection mechanism and it too eventually may be removed.

These broadly similar steps in the evolution of schooling in NSW can be seen in the brief summary provided in Figure 5. An advantage of a long-term perspective of this kind is that it is a reminder that today's schooling arrangements, syllabuses, examinations and qualifications exist at a point in history and are part of an evolutionary process. Schools of the past were not organised as they are today. For hundreds of years, in much of the world, children were educated in one-teacher village schools.

One-teacher schools also were common across NSW during the nineteenth century. Today's model of schooling, based on classes of children of the same age all being taught the same curriculum, became predominant during the 20th century. And it is unlikely that schools of the future will be organised as they are today, particularly as technologies play an increasing role in individualising learning.

A long-term perspective also allows current arrangements in particular phases of schooling to be seen in the light of changes that occurred in earlier phases. For example, current concerns about the best ways to cater for 'non-academic' students in the senior school have their parallel in early 20th century concerns in the junior secondary school. The response at that time was to introduce different curricula, sometimes leading to different qualifications. At one time there was a 'Commercial' certificate for 'non-academic' junior secondary students that sat alongside, and was eventually merged with, the mainstream 'Intermediate' certificate. As most of the age cohort has participated in a phase of school and progressed to the next, the trend has been to abandon attempts to provide differentiated arrangements and to provide all students with a largely common curriculum.

With a long-term perspective it also becomes clear that current differences in curriculum, teaching and assessment arrangements in the different phases of school often have resulted from the progressive addition of new phases as they were required. Today's students, rather than experiencing learning as a continuous and seamless process, often negotiate transitions and cope with between-phase differences that exist largely for historical reasons.

Primary

A small percentage of NSW children attended primary school in the early years of the colony. Participation rates grew throughout the nineteenth century. The concept of 'secondary education' did not really exist until the 20th century.

The Public Instruction Act of 1880 introduced compulsory, free education and made school education the responsibility of a government department. Primary schooling effectively became universal following the Act of 1880 when participation rates increased by 25 per cent. Examinations at the end of this phase, variously named the Qualifying Certificate Examination, High School Entrance Examination and Primary Final Examination, were eventually abolished.

Junior secondary

A small percentage of students attended secondary schools in the early 20th century. A Qualifying Certificate Examination for entry was introduced in 1911 (replaced by the High School Entrance Examination in 1923). By 1920, of the 46 000 students who completed primary school, 4000 began secondary school.

A review was initiated in 1933 into how junior secondary education could meet the needs of all students. By 1935, 60 per cent of students began secondary school, with the majority being considered 'non-academic'. The Intermediate Certificate at the end of this phase was broadened and a 'General Activities' curriculum was introduced in 1939 for less academic students. With almost all students progressing from primary to secondary school, the High School Entrance Examination was abolished in 1943.

By 1945, 97 per cent of students participated in junior secondary education. An 'Alternative Curriculum' was introduced for less academic students in 1946, but the Wyndham report of 1957 recommended a core of subjects for all junior secondary students, automatic transition from primary to secondary school, and the introduction of the School Certificate based on external examination. By 2011, with most students continuing to the senior secondary school, the School Certificate was discontinued.

Senior secondary

A small but growing percentage of students participated in senior secondary schooling by the mid-20th century following completion of the Intermediate Certificate and in preparation for the Leaving Certificate. By 1956, of the 50 000 students who had commenced secondary school, 8000 were enrolled in Year 12. The Wyndham committee recommended the introduction of the Higher School Certificate in 1957.

By 1995, 66 per cent of the 76 000 students who had taken the Year 10 School Certificate undertook the Higher School Certificate in Year 12. In that year, a review was initiated into the HSC (the McGaw review). The review recommended more advanced courses for more able students, the introduction of Technical and Further Education (TAFE) subjects into the HSC, and the clearer separation of the HSC from university selection processes.

By 2018, the apparent retention rate from Year 7 to Year 12 had increased to 77 per cent and almost 77 000 students were studying one or more Higher School Certificate courses. A national goal was set to lift the Year 12 (or equivalent) participation rate to 90 per cent by 2020. Following the Bradley review of 2008, there was significant growth in the proportion of Year 12 students continuing to tertiary study, with the expectation that at least 40 per cent of Australian 25-34 year olds would hold at least a bachelor's degree by 2025.

Figure 5 Brief summary of the evolution of schooling in NSW

A changing world

The past three decades have seen substantial change in the contexts in which schools work. Developments in technology have given students entirely new ways of communicating and interacting, as well as ready access to vast amounts of globally generated information. The nature of workplaces has changed irreversibly, along with the knowledge, skills and attributes most workplaces now require. And there have been profound changes in Australian society and its institutions. These and other developments have impacted the day-to-day work of schools and increased the challenges of engaging and supporting young people and preparing them for their futures.

For today's students, the world is less certain and less secure than it was for their parents' and grandparents' generations. They are living in a period of rapid, ongoing change and growing social fragmentation. Through the media, including social media, they are exposed directly to the details of global terrorism and violence. They are witnessing increasing public cynicism about traditional institutions, including religious and political institutions and their leaders; the erosion of traditional values; growing questioning of 'truth'; and the emergence of 'fake news'. Many are concerned about environmental sustainability, social inequalities and the future, and large numbers of today's students are exposed to the realities of substance abuse, easy access to age-inappropriate online content, and cyber-bullying. Parental anxiety and the addictive nature of technology have led many young people to become more isolated, more anxious and less social.

These developments present schools with enormous challenges. Dealing with mental health issues is now an essential part of the work of most schools. Building resilience in children and young people is a priority, as is promoting optimism, self-confidence and positive mindsets. With the decline of other institutions – sometimes including families – that once played a lead role in inculcating values and developing character, schools have found it increasingly necessary to give priority to students' social and emotional development, and often to their physical and mental safety, health and wellbeing.

This raises a question about the scope of the school curriculum. For many teachers, the 'curriculum' currently is defined by a set of syllabus documents and the associated outcomes they are expected to teach and students are expected to learn. This syllabus-driven conception of curriculum has been adopted at the senior secondary level and extended through the years of school. Schools' efforts to address mental health issues, build student resilience, inculcate values and develop character often are described as outside and additional to this formal school curriculum, and sometimes are considered to impinge on the time available for delivering the curriculum. But in the twenty-first century, should the curriculum of schools explicitly include and give greater priority to the social, ethical, emotional and physical development and health of every student, and recognise these as school-wide and school-long priorities? And if so, what role, if any, should a curriculum development authority play in supporting schools in these aspects of their work?

Rapid changes are also occurring in workplaces and to occupations that once provided destinations for school leavers. A growing proportion of routine, low-skill jobs are being replaced by machines or lost to low-wage economies. This is likely to accelerate with ongoing advances in robotics, artificial intelligence and machine learning. By some estimates, up to 40 per cent of existing occupations will be automated over the next two decades. These developments have profound implications for students and schools. In particular, it is becoming increasingly unacceptable for significant proportions of students to leave school with low levels of academic attainment. The OECD's Programme for International Student Assessment revealed steady growth in the proportion of NSW 15 year olds with unacceptably low levels of reading literacy, mathematical literacy and scientific literacy between 2000 and 2015. But even minimally acceptable levels of attainment in these areas are likely to be inadequate for meaningful employment in the knowledge economies of the future. There is an urgent need to lift the bar for every student.

Students with low levels of school attainment will be particularly vulnerable in an environment in which youth unemployment and underemployment remain serious issues. Nearly a third of Australian young people are currently unemployed or underemployed and many struggle to find employment in the fields in which they were trained. In 2016, only a third of graduates of vocational education and training (VET) programs were employed in their field of training. Students with low levels of school attainment are likely to be disproportionately disadvantaged in a more casualised workforce with lower levels of job security, increased part-time and freelance work, and multiple job and career changes. Already, 30 per cent of Australian workers are participating in flexible working arrangements involving multiple jobs or employers.

At the same time, there are growing shortages in the areas of Science, Technology, Engineering and Mathematics (STEM). The number of professional, scientific and technical jobs is predicted to increase substantially over the next decade, together with jobs in health care. And with continuing advances in digital technologies, skills in the use of information and communication technologies will be important for all students, with advanced skills becoming increasingly in demand. Despite this growing demand, average levels of school attainment in mathematics and science have been in steady decline over recent decades, as have the proportions of NSW students choosing to study more challenging STEM subjects in the senior years of school.

Changes in workplaces and the knowledge and skills they require have clear implications for schools and the school curriculum. Higher levels of attainment will be required across the board if most students are to be engaged productively in the knowledge- and service-based workforces of the future. This will include higher average levels of attainment in reading literacy, mathematical literacy and scientific literacy. Students also will require skills to work in modern workplaces and changing and uncertain environments, including transferable skills in communicating, collaborating, critical thinking, problem solving, digital literacy, project management, creativity and innovation. And, in an increasingly globalised world, students will require knowledge and skills to participate as active citizens and to work across national borders, including high levels of inter-cultural understanding.

The changing student population

The student population in NSW schools continues to grow in size and complexity. Today, approximately 1.2 million students in Kindergarten to Year 12 attend 3100 schools and are taught by more than 100 000 in-school teaching staff. These numbers are predicted to grow over coming decades in line with anticipated population growth. In Greater Sydney alone, the population is forecast to grow from 5.6 million to 8.4 million over the next three decades.

About 75 per cent of students currently attend schools in major cities. Most others attend schools in regional NSW, and a small percentage (less than half of one per cent) attend schools in remote and very remote parts of the state. Population projections anticipate a growing proportion of future students attending schools in metropolitan areas, including in Western Sydney, where the population is expected to grow by 70 per cent by 2041.

About 65 per cent of students currently attend government schools, 20 per cent attend Catholic schools, and 15 per cent attend independent schools. Over the past thirty years, the percentage of students in independent schools has increased significantly, with a decline in the percentage attending government schools. There is also a very diverse range of schools within each sector, including in size and wealth.

In recent years, a growing proportion of Aboriginal and Torres Strait Islander students have successfully progressed through the school system and into tertiary education.

The student population also has become more diverse as a result of immigration. Western Sydney is now the most diverse large urban area in Australia, with 35 per cent of its residents born outside Australia. In 2016, one third of students in NSW Government schools were from homes in which a language other than English was spoken. In some regions of Sydney, languages other than English are spoken in more than 40 per cent of homes, and in Parramatta, South West, and Inner South West regions, the percentages increase to more than 60 per cent.

Students with disability make up approximately 20 per cent of the NSW school student population, with education providers being required under the *Disability Discrimination Act 1992* and the *Disability Standards for Education 2005* to ensure students with disability are able to access and participate in education on the same basis as all other students.

In summary, the size and diversity of today's student population mean that students come to school with very different backgrounds, starting points and learning needs. The principles of equity and inclusivity require that every student be given access to the same curriculum and the support they require to progress and succeed. But this depends on the school curriculum providing the flexibility teachers require to respond to the increasing diversity of student needs.

Evolving understandings of learning

In parallel with these historical, contextual and demographic changes have been advances in understandings of human learning and the conditions that promote successful learning. These evolving understandings have been built from experience and confirmed and refined by research into learning.

Among the many things now known about learning is the crucial importance of emotional engagement. People are capable of remarkable levels of knowledge, expertise and accomplishment in areas of personal interest. Learning comes easily when it is driven by curiosity and passion. When motivated by personal goals, a search for answers, or something or someone they love, people are prepared to devote thousands of hours over many years to focused, purposeful learning. This is true across a wide range of endeavours, including careers, sporting activities, hobbies, personal growth and relationships.

We also know from research that becoming an expert in a field involves more than acquiring a body of knowledge or developing finely honed skills. Experts have deep understandings of their areas of expertise developed over extended periods of time. They understand the principles and concepts that underpin their field and around which facts and skills can be organised and understood. They not only know 'what', they also understand 'why'. Deep understandings give experts the ability to transfer and apply what they know to new situations and an understanding of the contexts to which their knowledge can be generalised.

For these reasons, what is learnt must have meaning for learners. People can learn meaningless information, but the intrinsic motivation for doing this is low, and such information is easily forgotten. Successful learning and effective recall are more likely when what is being learnt has personal meaning and when learners can see its relevance and potential applications. Learners also develop deeper understandings and are better able to recall facts and procedures when they have opportunities to apply these in practical, real-world contexts.

Successful learning depends on a learner's readiness to learn. People do not learn effectively when placed in unsupportive or unwelcoming learning environments. Unfamiliar cultural contexts and norms can be significant impediments to learning. People also do not learn effectively when presented with things they already know or when they lack assumed knowledge or skills. Learners benefit most from challenges that are beyond their comfort zones but within their reach – stretch challenges that require effort and possibly somebody else's support. Teaching, coaching, mentoring and counselling are in large measure processes of ensuring individuals are presented with well-targeted, appropriate and challenging learning opportunities.

Studies of neuroplasticity have demonstrated the remarkable human capacity for learning and raised expectations of what can be learnt given motivation, effort and the right kinds and levels of support. As educators, we are much less inclined than we once were to place limits on what individuals can learn given appropriately supportive conditions.

At the same time, research reveals individual learners to be at very different points in their learning.

It might be imagined, for example, that the practice of grouping school students by age and teaching every student the same age-based curriculum year after year would result in students of the same age becoming increasingly similar in what they know and can do. In fact, there is no current evidence of this.

In each year of school, the most advanced ten per cent of students are at least five to six years ahead of the least advanced ten per cent of students, and this appears to be unchanged across the years of school. And there is some evidence that, in mathematics, students become more varied in their levels of knowledge and skill the longer they are in school.

We also better understand the life-long nature of learning. Research in neuroscience has shown the capacity of the brain to form new neurons well into the ninth decade of life. Learning is an ongoing, long-term process, meaning that the points individuals reach in their learning by particular ages often are less important than the fact that they are continuing to make good progress in their learning.

It is important for learners to understand this. One of the most effective ways to promote learners' confidence in their ability to learn, to encourage a degree of self-control over learning, and to build an appreciation of the relationship between effort and success, is to enable learners to see the personal progress they are making – regardless of how they are performing relative to age peers or beliefs about where they should be by particular ages.

These are just a few things now known about learning, but they have profound implications for the construction of effective learning environments, the kinds of learning the curriculum prioritises and promotes, the way that learning opportunities are structured and provided, and the assessments required to guide teaching and drive successful learning.

Current policy priorities

Over the past two decades there have been important changes in the policy contexts in which NSW schools and school systems work. One feature of these changes has been increased national collaboration around identified policy priorities. The Commonwealth Government has played a more prominent role in working with the states and territories to set policy directions for school education. During this period, agreed national objectives have included improving overall levels of student performance; increasing the participation and attainment levels of priority equity groups; improving school completion rates and better preparing young people for post-school destinations; reforming school funding arrangements; and enhancing the effectiveness of teaching and school leadership.

To deliver these reforms, three national agencies have been established: the Australian Curriculum, Assessment and Reporting Authority (ACARA), the Australian Institute for Teaching and School Leadership (AITSL) and Education Services Australia (ESA). The work of these agencies has resulted in the development of an Australian Curriculum which has now been implemented fully or in part in all states and territories (in all learning areas from Kindergarten to Year 10 and in English, Mathematics, Science, History and Geography in Years 11 and 12); the introduction of a National Assessment Program – Literacy and Numeracy (NAPLAN) to assess, report and monitor student performance in priority curriculum areas including literacy and numeracy (accompanied by a national website to report publicly every school's performance); and the development and introduction of national standards for teaching, school leadership and initial teacher education.

Levels of student performance

A first priority for governments has been to lift levels of student performance nationally, particularly in literacy and numeracy. Concerns about students who were not mastering basic literacy and numeracy skills during their primary years led the NSW Government to introduce Basic Skills Tests in 1989.¹² All other states and territories introduced similar tests during the 1990s. The National School English Literacy Survey of 1996 confirmed that a significant proportion of Australian primary children were failing to achieve minimally acceptable standards of reading and writing.¹³

From the 1990s, the improvement of literacy and numeracy levels became a key educational priority for all governments and school systems. A range of initiatives were taken to address this priority, including the establishment of national partnerships focused on raising literacy and numeracy levels; the promotion of evidence-based approaches to the teaching of reading; the introduction of National Assessment Program-Literacy and Numeracy (NAPLAN) tests annually for all students in Years 3, 5, 7 and 9, replacing the earlier state- and territory-based tests; the development of targeted literacy and numeracy programs and funding; the introduction of literacy coaches into many schools; and the development of the national My School reporting website.

Although NAPLAN tests conducted between 2008 and 2018 showed no significant improvement in reading levels in NSW secondary schools over this ten year period, there were significant improvements in the reading levels of Year 3 and Year 5 students.¹⁴ Similar observations were made nationally. The Progress in International Reading Literacy Study (PIRLS) also recorded significant improvements in national Year 4 reading levels in the five years between 2011 and 2016, due mainly to improvements in Western Australia, Queensland and Victoria. The small improvement at Year 4 in NSW over these five years was not statistically significant.¹⁵

¹² G Masters, J Lokan, B Doig, S-T Khoo, J Lindsey, L Robinson & S Zammit, *Profiles of learning: the basic skills testing program in New South Wales: 1989*, Australian Council for Educational Research, Hawthorn Vic, 1990, viewed 24 July 2019, <<https://eric.ed.gov/?id=ED327276>>.

¹³ G Masters & M Forster, *Mapping literacy achievement: results of the 1996 National School English Literacy Survey*, Department of Employment, Education Training and Youth Affairs, Canberra, 1997, viewed 25 July 2019, <https://research.acer.edu.au/monitoring_learning/1>.

¹⁴ Australian Curriculum, Assessment and Reporting Authority, *National Assessment Program—literacy and numeracy achievement in reading, writing, language conventions and numeracy: national report for 2018*, Australian Curriculum, Assessment and Reporting Authority (ACARA), Sydney, 2018, viewed 24 July 2019, <<https://nap.edu.au/docs/default-source/resources/2018-naplan-national-report.pdf?sfvrsn=2>>.

¹⁵ S Thomson, K Hillman, M Schmid, S Rodrigues & J Fullarton, *PIRLS 2016: reporting Australia's results*, Australian Council for Educational Research, Camberwell, Victoria, 2017, viewed 25 July 2019, <<https://research.acer.edu.au/pirls/1>>.

In numeracy, there was no significant improvement in the performance of NSW students at any year level between 2008 and 2018. Nationally, NAPLAN reported an improvement in the performances of Year 5 and Year 9 students, especially in Queensland and Western Australia. The Trends in International Mathematics and Science Study (TIMSS) found no significant change in Year 4 or Year 8 mathematics achievement levels either in NSW or nationally between 2007 and 2015 (although there had been a significant decline in Year 8 mathematics and science levels in NSW between 2003 and 2007).¹⁶

From 2000, Australia participated in the OECD's Programme for International Student Assessment (PISA) – an assessment of reading literacy, mathematical literacy and scientific literacy at 15 years of age. Rather than testing basic skills, PISA assessed students' abilities to apply their knowledge and skills in reading, mathematics and science to a range of real-world problems. In this sense, it assessed higher-order academic skills.

Australian students' performances on PISA declined significantly between 2000 and 2015, both in an absolute sense and relative to average performance in all OECD countries. This was also the case in NSW, as shown in Figure 6. In 2000, when reading literacy was introduced as the major domain, NSW students performed well above the OECD average and among the highest performing countries in the world. The same was true when mathematical literacy was introduced as a major domain in 2003 and scientific literacy, in 2006. By 2015, this was no longer the case; NSW students performed just above the OECD mean.¹⁷



Figure 6 Average performance of 15 year olds in NSW and all OECD countries, PISA, 2000-2015

So although NAPLAN indicated no change in NSW secondary students' basic literacy and numeracy skills from 2008, and TIMSS indicated no change in Year 8 mathematics levels from 2007, PISA indicated a significant longer-term and continuing decline in 15 year olds' understandings of how to apply basic reading, mathematical and scientific knowledge and skills in practical situations.

In light of this evidence, the *Australian Education Act 2013* included a national target 'for Australia to be placed, by 2025, in the top five highest performing countries based on the performance of school students in reading, mathematics and science'.

The *National School Reform Agreement 2018* committed the Commonwealth and all states and territories to the joint pursuit of a national goal to improve the performance of all students, including priority equity cohorts. It was agreed that progress in achieving this goal would be tracked by monitoring the proportions of students in the bottom two and top two proficiency bands/levels of NAPLAN and PISA.

¹⁶ S Thomson, N Wernert, EJ O'Grady & S Rodrigues, *TIMSS 2015: reporting Australia's results*, Australian Council for Educational Research, Camberwell, Victoria, 2017, viewed 25 July 2019, <https://research.acer.edu.au/timss_2015/2/>.

¹⁷ S Thomson, L De Bortoli & C Underwood, *PISA 2015: a first look at Australia's results*, Australian Council for Educational Research, Camberwell, Victoria, 2016, viewed 25 July 2019, <<https://research.acer.edu.au/ozpisa/21/>>.

Performance of equity groups

A second major priority for Commonwealth, state and territory governments over recent decades has been to improve provision for specific equity groups, including Aboriginal and Torres Strait Islander students; students living in regional, rural and remote locations; students with disability; and students from educationally disadvantaged backgrounds. There has been continuing evidence of lower levels of participation, retention and academic attainment for these groups, resulting in government commitments to improve outcomes and reduce existing gaps.

Some progress has been made, particularly in improving participation rates. For example, in 2017, NSW achieved near-universal enrolment of four-year-old Aboriginal children in early childhood education. However, despite these high levels of enrolment, attendance rates remained low, particularly in regional and remote areas of the state. At the same time, the apparent retention rate from Year 10 to Year 12 for Aboriginal students remained unchanged at about 50 per cent between 2010 and 2018, compared to about 75 per cent for non-Aboriginal students.

The evidence from surveys of student attainment in literacy, numeracy, science, civics and citizenship and ICT literacy shows no consistent closing of the gap for any equity group. The graphs in Figure 7 are based on longitudinal data for the earliest cohort of NAPLAN students in NSW. Growth in reading and numeracy from Year 3 to Year 9 occurred on essentially parallel trajectories for Aboriginal and non-Aboriginal students, meaning that there was no closing of the gap for this cohort over these six years of their schooling. This has continued to be the case for subsequent cohorts of students, despite small but significant increases for both Aboriginal and non-Aboriginal students in reading in primary school.

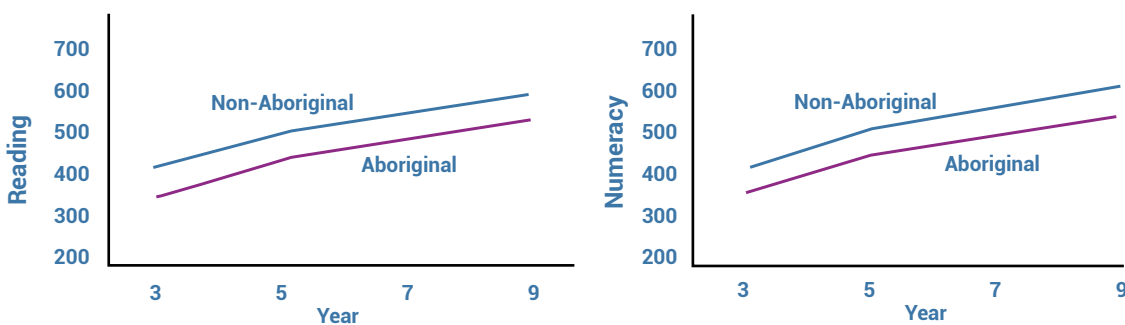


Figure 7 Average performance of NSW Aboriginal and Non-Aboriginal students on NAPLAN

Similar conclusions have been reached from Australia's participation in international achievement studies. The OECD's Programme for International Student Assessment (PISA) concluded that, for Australia as a whole, the decline in reading literacy, mathematical literacy and scientific literacy occurred for all major equity groups equally. There was no evidence of gaps closing for Indigenous students, rural and remote students, or low socioeconomic background students in reading literacy between 2000 and 2015, in mathematical literacy between 2003 and 2015, or in scientific literacy between 2006 and 2015.¹⁸

The IEA's Trends in International Mathematics and Science Study (TIMSS) concluded that the gaps for Australian Indigenous students in mathematics and science in Year 4 had 'changed little' over the 20 years between 1995 and 2015. For students in Year 8, the corresponding gaps for Indigenous students had 'not decreased measurably' over those same 20 years.¹⁹

¹⁸ Thomson et al., PIRLS 2016.

¹⁹ Thomson et al., TIMSS 2015.

In summary, based on the National Assessment Program between 2008 and 2018, the PISA surveys between 2000 and 2015, and the TIMSS surveys between 1995 and 2015, a number of conclusions can be reached about recent trends in the performances of NSW students:

- there has been a statistically significant improvement in reading levels in primary schools since 2008, but not in numeracy (NAPLAN);
- there was an improvement in Year 4 students' mathematics levels between 1995 and 2007, but no improvement since then (TIMSS);
- there has been no significant improvement in either reading or numeracy levels in secondary schools since 2008 (NAPLAN);
- there has been a significant decline in 15 year olds' abilities to apply knowledge and skills in reading, mathematics and science to practical situations and problems since 2000 (PISA);
- there has been a significant decline in Year 8 students' levels of achievement in mathematics and science since 2003 (TIMSS);
- there is no evidence that gaps in literacy and numeracy levels have closed for any major equity group since 2008 (NAPLAN); and
- based on national (rather than state) evidence, it seems likely that achievement gaps between Aboriginal and non-Aboriginal students in mathematics and science in Years 4 and 8 have been unchanged since 1995 (TIMSS).

These are confronting observations, especially given that the improvement of literacy and numeracy levels and the closing of gaps for Indigenous and socioeconomically disadvantaged students have been among the highest educational policy priorities of Commonwealth, state and territory governments for at least three decades.

Current strategies

The overarching policy priority in school education currently is to ensure that Australia has a high quality, high equity school system. *The National School Reform Agreement of 2018* committed the Commonwealth and all state and territory governments to the pursuit of this objective through three common national goals:

- to improve academic achievement for all students, including priority equity cohorts;
- to ensure all students are engaged in schooling; and
- to ensure students gain the skills they need to transition to further study and/or work and life success.

One strategy has been to set targets and timelines to improve national performance (for example, Australia to perform in the top five highest performing countries by 2025); close gaps for equity groups (for example, halve the Aboriginal and Torres Strait Islander gap in Year 12 participation rates between 2006 and 2020); and improve Year 12 completion rates (for example, lift the Year 12 or Certificate III completion rate to 90 per cent by 2020).

A high priority has been given to building the professional capacity of teachers and school leaders to deliver improved teaching and learning and thus improved outcomes. At a national level, this priority has been pursued largely through the work of the Australian Institute for Teaching and School Leadership.

In NSW, it has been pursued since 2004 through the NSW Institute of Teachers (now incorporated into NESAs) and through the development of the 2013 *Great Teaching, Inspired Learning* blueprint.²⁰

A further strategy has been to provide NSW Government schools with greater autonomy to make decisions about the most effective ways to deploy available resources to meet student needs and improve outcomes. This followed the 2012 *Local Schools, Local Decisions* reforms.²¹

The reform of school funding arrangements also has been seen as an essential strategy for raising educational standards and achieving more equitable outcomes in Australian schools. A key development was the 2011 Review of Funding for Schooling and its recommendation that schools be funded on the basis of student need rather than school type or sector.²²

²⁰ NSW Education Standards Authority, *Great teaching, inspired learning: blueprint for action*, New South Wales Government, Sydney, March 2013, viewed 25 July 2019, <<https://educationstandards.nsw.edu.au/wps/portal/nesa/about/initiatives/great-teaching-inspired-learning>>.

²¹ NSW Department of Education & Communities, *Local schools local decisions: report on the consultation*, NSW Government, Sydney, 2012, viewed 25 July 2019, <https://schoolsequella.det.nsw.edu.au/file/3d9c0df5-e220-4e12-bc09-71a340d7126f/1/Local%20Decisions%20Report%20on%20Consultation_.pdf>.

²² Review of Funding for Schooling, *Review of funding for schooling: final report*, Department of Education, Employment and Workplace Relations, Canberra, 2011, viewed 25 July 2019, <<https://docs.education.gov.au/documents/review-funding-schooling-final-report-december-2011>>.

And the 2018 Review to Achieve Excellence in Australian Schools in its report *Through Growth to Achievement* included among its recommendations a call to governments to provide teachers and schools with greater assistance in monitoring individual student progress, diagnosing specific learning needs, and implementing evidence-based teaching strategies and interventions.²³

Curriculum challenges

This brief look at the context in which schools now operate reveals a number of challenges for the school curriculum.

The history of schooling in NSW is a reminder that the different phases of school were introduced at different times in response to growing student demand. This has resulted in differences in curriculum, teaching and assessment arrangements in different phases, and somewhat artificial transitions between phases. A challenge is to provide greater continuity and seamlessness of learning from pre-school, through the school years, and into post-school destinations.

History also suggests that current arrangements will change. In particular, as universal participation in the senior secondary school is approached, it is likely that greater efforts will be made to remove academic/non-academic curriculum distinctions. It is also likely that the transition that currently looms large in the consciousness of students, schools and the wider community – at the end of secondary school – will assume a lower level of significance as more students continue their learning seamlessly across this transition. Selection at this point is likely to become less relevant. And it might be predicted that, as participation rates in tertiary education continue to grow, academic/non-academic distinctions in that sector also will be replaced by more integrated approaches to theoretical and applied learning. All these developments invite the reimagining of the curriculum in the final years of school.

Ongoing changes in Australian society are requiring schools to take on broader roles and responsibilities than the implementation of a set of syllabuses. Schools are increasingly focused on students' social and emotional development, physical and mental health and wellbeing, and a range of personal skills and attributes, including resilience, optimism, and the ability to communicate and collaborate with others. School-wide priorities of these kinds are not adequately addressed as syllabuses and 'outcomes', but nevertheless need to be recognised as part of the total curriculum of today's schools. A challenge is to provide the time and support in schools to address these broader priorities.

Advances in technology are changing not only what students learn at school, but also how and where they learn, with implications for curriculum, teaching, learning and assessment. These advances also are changing fundamentally the nature of work and the knowledge, skills and attributes required in the workplace. Developments in robotics and machine learning are eliminating many existing jobs and creating others, with the most significant impact being on low-skill occupations, most of which are likely to disappear. Rather than providing job-specific skills, the school curriculum increasingly will need to equip young people with deep understandings and general skills and attributes that provide a broad preparation for further learning, life and occupations yet to be created. The pressing curriculum challenge is to set higher expectations for every student's learning.

At the same time, the student population is becoming increasingly diverse. Students in schools today have more varied backgrounds, including language and cultural backgrounds, than students of the past. This trend is likely to continue. The curriculum of the future must be designed to be inclusive of all students, but it also must have the flexibility to allow teachers and schools to provide learning experiences appropriate to students' increasingly varied backgrounds, starting points and learning needs.

Research into human learning highlights the importance of emotional engagement in learning – of nurturing wonder and igniting passion. Emotional engagement is unlikely when students fail to see the relevance of what they are learning or when teaching fails to connect with individuals' backgrounds and readiness. A curriculum that expects teachers to deliver large amounts of content to all students in the same time period limits teachers' abilities to teach core content in depth, to explain relevance, and to tailor teaching to individual needs. The challenge is to design a curriculum that promotes deep learning and provides teachers with the flexibility they require.

²³ Department of Education and Training, *Through growth to achievement*.

Finally, the context for this Review includes current national concerns about stagnating or declining levels of student attainment in curriculum areas such as reading, mathematics and science. Although there have been recent improvements in reading levels in NSW primary schools, there is no evidence of improved performances in secondary schools and evidence exists of a long-term decline in 15 year olds' abilities to apply their knowledge and skills in real-world contexts. It might be assumed that improved student performance depends almost entirely on the efforts of schools, teachers and students. However, schools, teachers and students work within the constraints of a curriculum, which can be limiting – particularly if the curriculum tightly specifies what should be taught, when it should be taught, and how long should be spent teaching it. High-performing school systems recognise that the content and structure of the curriculum are important determinants of the quality of student learning. They see the curriculum as one element of an integrated learning 'system', all elements of which are underpinned by a set of learning principles.²⁴ These other elements include, but are not limited to, assessment arrangements, professional learning for teachers, support for school leaders, and early interventions.

A challenge is to ensure the future curriculum and the broader learning system of which it is a part are designed around common, well-established principles capable of improving levels of student performance.

²⁴ M Tucker, *Leading high performance school systems: lessons from the world's best*, Association for Supervision and Curriculum Development (ASCD), Alexandria, VA, 2019, viewed 25 July 2019, <<http://www.ascd.org/Publications/Books/Overview/Leading-High-Performance-School-Systems.aspx>>.

2. COMMUNITY ASPIRATIONS

Submissions to the Review and input to consultation meetings reflected widespread consensus on the purposes of schooling and the kinds of attributes, knowledge and skills that schools should be working to develop in young people. The NSW community has high aspirations for its schools and the school curriculum. The curriculum is seen as the principal guide to ensuring that every student masters foundational learning, is exposed to a breadth of disciplinary knowledge and skills and is challenged to deep learning through more advanced studies in areas of personal interest and passion. A shared aspiration is to see every student engaged in meaningful, enjoyable learning that provides foundations for further learning, future work and citizenship.

Unlocking every student's learning

In identifying purposes of schooling, many submissions referred to the centrality of individual learners and their ongoing learning and development. They used a variety of terms to describe this purpose, such as supporting each student to 'reach their full potential', 'experience individual success', 'achieve their personal best', and 'achieve their aspirations'. Some emphasised that this purpose embraced more than academic success; it also included supporting students to achieve their social, physical, emotional, creative and spiritual potential. For many, the primary purpose of schooling and the school curriculum is to assist every student to grow and develop to be the best they can be. However, it was impressed on the Review that this objective should not imply a belief that students differ in their potential.

Ensuring that every student makes the best possible progress in their learning and development while at school was seen as essential to improving individuals' life chances and providing every student with access to a broad range of post-school opportunities. Schools were regularly described as having a responsibility to prepare every student to be a happy, lifelong learner and a valued, contributing member of society.

Some submissions pointed out that this aspiration is already well captured in the *Educational Goals for Young Australians*, (the Melbourne Declaration), the *Australian Education Act 2013*, the recommendations of *Through Growth to Achievement* (the Gonski report) and the propositions underpinning the Australian Curriculum. For example, it was pointed out that the Melbourne Declaration includes the goal that 'all young Australians become successful learners, confident and creative individuals and active and informed citizens' and that, under the *Australian Education Act 2013*, 'all students in all schools are entitled to an excellent education, allowing each student to reach his or her full potential so that he or she can succeed, achieve his or her aspirations, and contribute fully to his or her community, now and in the future'.

Some noted that this purpose of schooling had always been its primary purpose and was largely unchanged 'since the time of Plato and Aristotle'. At its heart, schooling is about developing attributes, knowledge and skills that will allow students to flourish as individuals and move into the adult world with, as one submission put it, 'agency, agility, inventiveness, flexibility and concern for and understanding of others'. There was near-universal agreement that the ultimate purpose of schooling and the school curriculum is to see every student become an effective, contributing member of society.

However, a large number of submissions noted that the world in which students now live and schools operate has changed markedly in recent decades, and continues to undergo rapid change. Schools now need to equip young people for an increasingly complex, dynamic, globalised and uncertain world. Technology is revolutionising how people live and work, including by removing earlier constraints of space and time. Entire categories of work, particularly low-skilled activities, are disappearing to automation and/or low-wage countries. At the same time, it is becoming increasingly urgent to find solutions to an array of complex social and environmental problems.

It was argued that basic levels of knowledge and skill will not be sufficient to negotiate and function in this more complex world and that, to prepare students for the knowledge-based occupations of the future, schools will need to 'lift educational standards across the board'. Unlocking every student's potential will mean working to develop new and higher levels of student knowledge and understanding, skills in applying that knowledge, and social and emotional competence to live and work in a complex, changing environment.

Many submissions stressed that, while the purpose of schooling must be much more than to prepare young people for work, it is essential that students are equipped with information to make wise choices about future vocations, as well as higher levels of attainment and competence to work in an increasingly globalised world using technologies yet to be invented.

Maximising social benefits of schooling

There was also widespread recognition of the social purposes of schooling in providing a highly skilled future workforce; transmitting cultural knowledge and values; and ameliorating disadvantage and promoting social cohesion and mobility.

In underlining the importance of a highly skilled future workforce, some submissions referenced the *Australian Education Act 2013* and its goal for schools to 'create a highly skilled, successful and inclusive workforce, strengthen the economy, and increase productivity, leading to greater prosperity for all'. One submission argued that a key purpose of schooling and the school curriculum must be to 'support young people into pathways that lead to positive and sustained work outcomes and to address some of the chronic skill shortages faced by NSW businesses'.

There was considerable agreement on the kinds of general attributes and skills likely to be required to create such a workforce. These included critical and creative thinking, the ability to collaborate, resilience and adaptability, communication skills and problem solving. Some described these as distinctively 'human' attributes and skills, beyond the capability of machines.

It was also recognised that an important purpose of the school curriculum is to pass accumulated knowledge, wisdom and values from one generation to another. As one submission observed, the curriculum is a 'mechanism to make sense of who we are and to pass on the values, ethos and traditions of our culture through an understanding of history, society and community'.

Schools were seen as having unique potential to contribute to a 'just and healthy society' by promoting more equitable outcomes, enhancing cultural understanding, reducing the impact of socioeconomic disadvantage, and promoting social cohesion and social mobility. A number of people mentioned the Melbourne Declaration goal to promote 'equity and excellence' through school education. And some drew attention to the alignment of this social purpose with their own statements of system and school priorities.

Promoting wellbeing and building character

A common theme in submissions and consultations was the vital role that schools now play in relation to student wellbeing, mental health and the development of personal and social capabilities. This was a particularly strong theme in conversations with people working in schools. Some observed that teachers increasingly have to identify and manage students with mental health concerns. For others, a focus on wellbeing, emotional intelligence and the building of character was driven by a vision of the kind of people they want students to be by the time they leave school, which in turn reflected their aspirations for the future of Australian society.

Some viewed the development of personal attributes – including students' mindsets, values, attitudes and dispositions – as among the most important outcomes of the schooling process, sometimes prioritising it above the development of knowledge and skills. Students' physical and mental health, wellbeing and social-emotional growth were identified in one submission as the 'new key priorities'.

Underlying these calls for increased attention to student wellbeing and the development of personal and social capabilities were explicit concerns about 'rising levels of stress and health problems among young people', a perceived lack of resilience and greater levels of 'emotional fragility' in many students, and the impact of social media and screen time on students' lifestyles, relationships and behaviours.

Submissions identified, and sometimes listed, the kinds of personal attributes that should now be prioritised in schools. These included positive mindsets such as a sense of optimism, a sense of hope, a sense of belonging and a sense of purpose. Schools and parents saw it as central to the work and mission of schools to promote every student's sense of self-worth, self-confidence, self-drive and self-management. And there were references to the importance of developing students' self-awareness, understandings of their place in the world, metacognitive skills and awareness and appreciation of their own beliefs, values and aspirations.

One aspect of character building identified in submissions was the development of moral and ethical understanding. It was considered important that every student learn to make judgements of value and worth, to know the difference between right and wrong, and to make ethical decisions for the common good. One submission identified a key purpose of schooling as the creation of 'moral and ethical contributors to society'. Another considered it important that students develop the confidence and desire to make changes in the world when they believe change is required.

There were numerous references to the need for schools to develop new levels of resilience in young people, enabling them to cope with future ambiguity and change and to recover quickly from failure and disappointment. Schools needed to support students to learn how to 'bounce back and get on with it when things don't go their way', persist, overcome challenges, struggle when required, and display 'grit and determination'. Coping with ambiguity and change would require courage, open-mindedness and a willingness to take risks. And with changes in the structure of work, young people would need flexibility and versatility to move fluidly between the multiple jobs they were likely to have.

There were also concerns about some students' abilities to socialise and to relate to others. It was reported that some students appear to have become increasingly socially isolated, with technology a possible contributing factor. Teachers were concerned about these students' abilities to form healthy relationships and stressed the importance of developing social competence, including the attributes of empathy, compassion, respect, tolerance, patience and 'kindness'. As well as being crucial to the creation of an inclusive, coherent and compassionate society, these personal attributes were seen as essential prerequisites for effective collaboration and teamwork and for leadership in inspiring and influencing others.

One submission proposed that a goal of schooling should be to see students become 'individuals with a heart'. For many, this included being committed to social justice and an inclusive, peaceful society. Another submission argued that, as a society, we 'need to be making our schools places where democracy flourishes', which in turn depended on developing the attitudes, values and cultural competencies required to live and participate in a culturally, linguistically and religiously diverse democracy. Some made particular reference to students valuing Aboriginal and Torres Strait Islander histories and cultures in this context.

Teaching subject content is one thing in school, but parents and carers have also expressed to CCSP that values such as respect, diversity, compassion, empathy and emotional intelligence are underpinnings to a curriculum that caters to the needs of the individual learner. Resilience, social skills, good communication, teamwork – these are again examples of essential personal attributes that are developed within individual students and are valuable in life and in the workforce.

Council of Catholic School Parents NSW/ACT

Discussions of students' personal attributes also encompassed their attitudes and approaches to school, including their interest in and commitment to learning. Some observed that children in the pre-school years display high levels of curiosity and creativity, but that these attributes often diminish once they are in school. Maintaining a spirit of inquiry and an interest in learning was seen as a major challenge in relation to many students. One person observed that 'currently in the education system, for a majority of young people, you see a lot of eyes glazing over'.

The importance of intrinsic motivation for learning was occasionally mentioned. This was seen to be absent in much current school learning, with students being motivated instead by external influences such as tests, grades and examinations, sometimes resulting in unacceptable levels of performance anxiety. The satisfaction of personal discovery was often missing in schools, undermining students' desires to continue with formal education and learning. One person observed that 'schools need to be able to create curiosity in young people'. Another simply observed that 'the purpose of schooling is to create learners'.

There was also discussion of the importance of students developing positive beliefs about their own abilities to learn successfully. This was often referred to as a 'growth mindset' – a belief that the ability to learn successfully is not fixed and that everybody is capable of learning given the right conditions and the required effort. Again, this was identified as a current concern in schools, with many students internalising the belief that they are inherently poor learners or are 'not good at maths', sometimes reinforced by the messages that schools deliver them.

In summary, the promotion of student wellbeing and mental health, the development of desired personal attributes and the building of character were seen by school systems, teachers and parents as central and vital purposes of schooling – at the heart of the school mission and relevant to all aspects of school life at all times. For this reason, it was considered inappropriate to consign the development of these attributes to any particular learning area or any particular stage of school. Interestingly, however, this aspect of the work of schools was not always seen as part of the school curriculum, which sometimes was associated only with prescribed syllabuses for key learning areas. For example, teachers sometimes said they were unable to devote adequate time to issues of student wellbeing and the building of character because they were so busy delivering 'the curriculum'.

Developing knowledge and deep understanding

Another major theme in submissions to the Review concerned the importance and role of knowledge acquisition in the school curriculum. Some considered that an emphasis on factual and procedural knowledge was becoming less appropriate given significantly improved access to information through advances in technology. Others rejected this argument, occasionally interpreting it as an attack on standards and rigour, and expressed concerns about the possibility of school subjects not remaining the primary organiser of the curriculum.

Perhaps most commonly, subject knowledge was described as being of timeless relevance – alongside the development of a range of personal attributes and skills – with submissions emphasising the importance of focusing teaching and learning on core knowledge and deep understandings of disciplinary concepts, principles and 'big ideas'. A regular call was for 'depth not breadth' and some commented that, when it comes to curriculum content, 'less is more'.

A variety of reasons were advanced for maintaining a strong focus on traditional school subjects. For some, disciplines such as the arts, humanities and sciences provided a well-rounded education that introduced students to distinctively different ways of thinking, understanding and interpreting the world. One submission argued that 'every child in the state should have meaningful experiences of these'; another, that providing all students access to a knowledge-rich curriculum was a 'key plank of educational equity in NSW schools'.

For some, a solid grounding in traditional disciplines was the best way known to prepare young people to lead thoughtful and productive lives. It was also argued that 'employers need deep subject-specific knowledge' and that students who lack such a grounding will not be well prepared to cope with future changes and job disruptions. Strong foundations of this kind would be 'more difficult and more costly' to develop later in life.

Still others drew attention to skill shortages in areas such as engineering and the need to encourage more students to undertake high-level study in science, technology, engineering and mathematics. Mastery of disciplinary knowledge was described as essential to higher-order thinking and multidisciplinary problem solving, and it was observed that post-school courses presuppose high levels of content mastery in school subjects.

A common view was that all students should be exposed to a range of disciplines as a matter of 'common entitlement'. One submission recommended identifying 'threshold' learning outcomes that every student should be expected to achieve in each of these disciplines. However, there was much less consensus on what this range of disciplines should be. There were suggestions that, in secondary schools in particular, fewer mandated subjects taught in greater depth were desirable. One submission noted that, while music, art and languages are often considered part of this common entitlement, 'modern' disciplines such as technology and engineering, media, and entrepreneurship are now also being promoted for inclusion. Some called for a greater focus on science, technology, engineering and mathematics subjects. Others worried that this risked skewing the curriculum away from the study of humanities and social science subjects in ways that could disadvantage young people. The range and mix of subjects that students should study in secondary schools was considered a crucial topic for discussion and resolution, and inevitably would require 'a negotiated compromise'.

Students need to develop the critical skills and knowledge that pertain to each discipline of study as the disciplines offer different ways of understanding and expressing the world and value various aspects of the world differently. In supporting what is distinctive in each subject, schooling should provide students with opportunities to identify and apply the particularities of the disciplines to address cross-disciplinary real-world problems. Equally, they need to experience ways that the disciplines are similar and overlap, and how knowledge, skills and processes from one may be used for creative effect in another.

English Teachers Association NSW

Many submissions emphasised the importance of focusing the curriculum in each school subject on deep, conceptual learning. Giving greater priority to core concepts, principles, big ideas and disciplinary ways of thinking and working was seen as an alternative to, and protection against, expecting students to learn large volumes of relatively superficial factual and procedural knowledge.

Such 'conceptually organised' subjects required a coherent framework that identified the 'key concepts, skills and processes central to understanding within each disciplinary area'. This approach would enable teachers to teach for greater depth of understanding and would provide time for in-depth explorations of concepts. An accompanying 'spiral curriculum' structure would allow for the consolidation of learning by revisiting concepts with 'increasing degrees of complexity'. The principle of designing around conceptual understandings that develop across the years of school also was seen as a way of achieving 'coherence over a K to 12 horizon'.

Examples were provided of what a more conceptually organised subject might look like. These included the *English Textual Concepts* resource, developed jointly by the Department of Education and the English Teachers Association in response to teachers' desires for more conceptually based programs. This resource was described as providing teachers with 'progressions of what students understand about each concept', syllabus content to develop deeper understandings, and descriptions of what students are able to do to demonstrate their levels of understanding. According to one submission, teachers using the *English Textual Concepts* resource have reported that it has 'helped them focus at the heart of the subject' and, for many primary teachers in particular, has been 'eye-opening, in defining what the subject is'.

Another example was Siemon's *Six Big Ideas* in mathematics, which was described as a framework teachers can organise around to 'declutter content'. In the area of 'multiplicative thinking', for example, Siemon's framework describes eight levels of increasing conceptual understanding, thinking and problem solving from initial understandings based on concrete materials to the confident use of a wide variety of multiplicative structures and symbolic forms. The framework is accompanied by assessment tasks and teaching advice to develop multiplicative thinking, and is relevant for most students in Years 4 to 9.

Big ideas are the major concepts that anchor a coherent curriculum. Content that is based on big ideas and sequenced to provide the foundation for development of higher order skills and thinking shifts the curriculum focus from a multitude of discrete knowledge and skills to the meaningful connections among them. A good example of this is the English textual concepts project, in which the big ideas were drawn out through rigorous analysis to develop a form of progressions for the core learning concepts in English.

NSW Department of Education

Exposure to a range of school subjects in the primary and early secondary years, and successful learning in mandated subjects, were seen as part of the common entitlement that should be available to every student, as well as the foundations on which individuals can choose to build more advanced learning in the later years of school. The achievement of common disciplinary foundations 'opened up subject choice', enabling students to pursue personal interests and learning pathways through the senior years and beyond into post-school learning and work.

Submissions observed that students in secondary schools require access to viable options and pathways to identify and pursue their interests and passions. This was especially important following the raising of the school leaving age to seventeen and with the broader range of students now completing school. As one submission noted, 'by the end of secondary school education, each individual will be different, and each must have been supported to develop their capabilities to the maximum possible extent'.

Study in the later years of school should assist students to appreciate how subject learning 'connects with the world of work'. Students should have 'opportunities to connect with, and experience, industries and post-school education and training as part of subject-based learning while still in secondary school' to build an appreciation of the relevance of school subjects to post-school learning and work. Some described this as important for all students, but especially for the one in four school leavers who move directly into full-time or part-time employment and discontinue formal study on completing school.

Another regularly expressed aspiration was to see greater equivalence (or 'parity of esteem') of subjects and learning pathways in the later years of school. One submission commented that 'the current distinction between vocational and academic courses in the final years of schooling ought to be reviewed'.

And there were calls for greater continuity of learning and seamlessness of transitions between schools, tertiary institutions and workplaces. The end of schooling, one submission observed, should not be seen as the end of learning: 'connections (back and forth) between schools and tertiary institutions, TAFE and the workplace need to set up ongoing learning as an aspect of life'. Suggestions included strong industry partnerships to allow students to apply subject content in real-world contexts and to tap into and make use of industry expertise. Principals reported that they would welcome improved links with universities to challenge and meet the learning needs of more advanced students.

In summary, there was widespread support for providing every student with exposure to a range of traditional disciplines and core disciplinary knowledge, skills and thinking as part of the common entitlement of schooling. There was a strong view that learning in these subjects should be focused on the development of students' deep understandings of key disciplinary concepts, principles and ways of working, and that these should be prioritised over comprehensive coverage of factual and procedural content. The curriculum should enable and promote the development of such deep understandings through the progressive building and revisiting of key concepts and big ideas across the years of school. With foundations in the common entitlement of school subjects established, students should have opportunities to pursue studies in areas of personal strength and interest. And efforts should be made to ensure studies in different areas of learning are of equivalent rigour and esteem.

Building skills in applying knowledge

Many submissions emphasised the importance of providing students with meaningful opportunities to apply knowledge and understandings and of developing students' skills to do this.

Opportunities to put learning into practice were considered essential for the development of deeper understandings of subject matter; to provide greater appreciation of the uses and relevance of what is being learnt; to increase interest and engagement; and to build a range of relevant enabling skills. It was regularly pointed out that the ability to use knowledge – as opposed to merely reproducing it – is an essential requirement in post-school life, learning and work.

Submissions gave extensive consideration to skills that support the application of subject knowledge, including skills in using technologies, reading, writing, sourcing and evaluating information, working with others, communicating, analysing situations, investigating alternatives, reasoning numerically, clarifying and solving problems, and creating new approaches and solutions. A wide range of cognitive, creative and interpersonal skills were identified as essential to effective knowledge application.

There was very strong support for giving greater attention to enabling skills of these kinds. One submission commented that 'it's critical to future work and success that these skills be more explicitly developed and measured at school'. Many observed that the ability to apply knowledge through analytical reasoning and problem solving is essential in modern workplaces and is becoming more important. Some argued that content knowledge alone is no longer sufficient and 'too narrow for most students'; the school curriculum needed to be 'refocused' to give more attention to skills of application, and more time in schools needed to be made available to allow this to happen. A few argued that these enabling skills are becoming more important than – and 'should take precedence over' – factual knowledge, because facts are now readily available on students' devices.

Comments of this kind often reflected the fact that skills in applying knowledge tend to have taken on a life of their own by being separated out and labelled (for example, '21st century skills', 'soft skills', 'competencies', 'capabilities'). For some, this labelling had had the effect of making them seem separate, secondary or even 'optional'. The term 'soft skills' made them sound 'frivolous'. It also had led to perceived 'tensions' between knowledge and skills that now needed resolution. Continuing this theme of separateness, some submissions argued that skills for application now needed to be 'embedded' into the curriculum; others observed that they were already there.

A number of submissions expressed the view that opportunities and the capacity to apply knowledge – and the development of skills to do this – should be seen as essential and integral aspects of school subjects throughout the years of school. As one submission noted, 'such skills cannot be learned in isolation from a knowledge base and must not be thought separate from it'. Critical thinking, for example, was described as a 'dimension' of students' developing competence in an area of learning. Another submission observed that it was 'impossible to be creative or imaginative with any authenticity without deep knowledge of any subject'. Knowing and doing needed to be as 'intertwined' in school learning as they are in much post-school learning (for example, in automotive engineering or dentistry). The fact that they are not was seen by some as an indicator of how rarefied 'academic learning' sometimes has become in schools.

Strongly linked to the development of knowledge basics, and not separate to it or isolated from it, is the development of skills and the capacity to apply knowledge. Problem based learning has widely been used to motivate students and support the development of other skills. These other skills include the ability to create and communicate an idea or argument, operate effectively as an individual and as part of a team, draw more widely on sources of information across a range of discipline areas, apply technology to problem solving and solution finding and build an ethical and social framework. Such skills cannot be learned in isolation of a knowledge base and must not be thought separate from it.

University of Technology Sydney

The skills most commonly mentioned in submissions were consistent with those identified in the Australian Curriculum and a range of recent international reports and commentaries. They included:

- **Literacy and Numeracy.** These were almost universally identified as essential enabling skills. Adequate levels of literacy and numeracy were seen as fundamental prerequisites for deep understanding, the application of subject knowledge and the development of higher-order skills such as problem solving, data analysis and critical thinking. They were described in one submission as 'the foundations for all learners'. A number of secondary teachers, TAFE teachers, parents and employers referred to the concerning numbers of students leaving school with significantly inadequate levels of literacy and numeracy, and one submission saw the improvement of these skills as a current 'priority for the school curriculum'.
- **Digital Literacy.** Students' abilities to apply technology in subject-based learning and problem solving were regularly described as increasingly important skills. These skills included being able to 'decipher and navigate digital content from a variety of sources' and keeping abreast of, and being able to use, new and emerging technologies. There were a number of references to the importance of developing students' skills in coding and computational thinking, particularly but not exclusively in discussions of problem solving in science, technology, engineering and mathematics.
- **Problem Solving.** The use of subject knowledge, including subject knowledge from a number of areas of learning, to solve real-world, complex problems was seen as a key form of knowledge application. The team-based solution of meaningful, practical, real-world problems also was viewed as an important motivator of student learning. Submissions referred to the importance of students having opportunities to engage in all aspects of the problem solving process, including problem identification, planning and organising, systems thinking, design thinking, project management, model-making, and solution testing and evaluation.
- **Teamwork.** Many references were made to the importance of teamwork in modern workplaces, with individuals having to work both alone and collaboratively to find solutions to problems, to create new products, services and solutions, and to deliver complex, multi-faceted projects. It was considered important that, throughout their schooling, students have opportunities to develop skills in working productively with others on personally meaningful challenges.
- **Critical Thinking.** Students' abilities to analyse and evaluate situations to make rational, dispassionate judgements about appropriate courses of action are key skills in all problem solving and most knowledge application. Critical thinking typically requires students to draw on their knowledge and understandings of important concepts and principles in one or more areas of learning and to apply those understandings thoughtfully to 'specific information and challenges'. At least one submission noted that high-level thinking of this kind in turn supports deep learning of subject content.
- **Research Skills.** There were also frequent references to the need for students to develop inquiry skills. Even children in the early years of school, it was argued, need 'skills to be able to find out information about the world'. These skills included 'experimenting, hypothesising, critique and reflection'. As they progress through school, students should become increasingly proficient in identifying issues, formulating questions and hypotheses, designing investigations, gathering and analysing relevant information, and evaluating, critiquing and reflecting on the results of investigations and experiments.
- **Creative Thinking.** The ability to create new ideas and solutions was identified as important for applying knowledge and contributing in future workplaces. There were regular references to the desirability and benefits of promoting innovative and lateral thinking, imagination and student initiative and enterprise. In this context, some called for greater attention to entrepreneurial thinking and skills, and schools described programs they had introduced to promote these.
- **Interpreting Information/Data.** Skills in sourcing data or information relevant to an issue or problem and processing, analysing, interpreting and evaluating information also were seen as essential enabling skills. One submission observed that 'young people need to be able to locate, discern and filter information', especially now that so much information of variable quality is readily available to them. Students' willingness to question and their abilities to make judgements about the quality of data and information was mentioned a number of times in submissions.
- **Communication Skills.** Beyond basic literacy skills in reading and writing, students require higher-order skills in communicating ideas, arguments and proposals – verbally, graphically and in writing. This includes the ability to participate effectively in team meetings, to pitch ideas and make presentations.

In summary, there was strong support for a much greater focus on knowledge application in the learning of school subjects and for the development of skills that enable students to apply their learning to meaningful challenges and problems. However, as observed in relation to the promotion of student wellbeing, mental health and personal attributes, the provision of meaningful opportunities to apply knowledge, and the development of skills for knowledge application, were not always seen as part of the current school curriculum. For example, one submission warned against focusing 'only on the curriculum rather than on creating powerful learning experiences that support the development of the capabilities, skills, dispositions and character traits we want students to develop'.

A curriculum that meets every student's needs

The most strongly expressed aspiration in submissions to the Review was to see each and every student's learning needs being identified, addressed and met. There was also widespread agreement on the kinds of teaching required to realise this aspiration and the role the curriculum plays in enabling such teaching.

Implicit in many submissions – and explicit in some – was an underpinning belief in every student's ability to learn successfully given appropriate learning conditions, student effort and teacher support. A common belief was that every student should be expected to achieve ambitious personal learning goals.

A number of submissions observed that students are at very different points in their learning and so have different teaching and learning needs. Despite this, it was argued, all students should be expected 'to make good progress from whatever their starting points are', recognising that for some students with disability, good progress 'may occur in much smaller increments than for other students'. Some interpreted this expectation as aspiring to maximum individual learning growth for every student every year, and several submissions included the Gonski call to make this the primary focus of efforts in schools.

A key to maximising every student's learning was considered to be quality teaching appropriate to the points individuals have reached in their learning. Teaching that is targeted on students' current levels of attainment and learning needs was seen as a way of ensuring that every student is challenged by material at an appropriate level of difficulty and content. To do this, teachers needed to be able to 'differentiate and personalise learning to their students' needs and developmental progress'.

It was recognised that there are significant challenges for teachers in providing every student with appropriately targeted learning opportunities given students' widely varying levels of attainment. (More than one submission referred to the variability in students' literacy and numeracy levels in each year of school being the equivalent of five or six years of learning.) However, the consequences of not meeting the needs of the full range of students were seen to be less-advanced students falling further behind in their learning and more-advanced students not being adequately challenged and extended and falling short of their potential.

Submissions noted that the ability to target teaching on individuals' learning needs depended on teachers having a good understanding of where students are in their learning. One person described this as starting from the ground up – understanding what individuals need and then designing teaching to address those needs. The ability to establish and understand where individuals are in their learning was seen as an essential skill of all teachers that required 'an understanding of the diversity and complexity of learner needs'.

Related to the observation that students are at different points in their progress was the observation that students learn at different rates. Some stressed the importance of students being able to achieve curriculum outcomes 'at their own pace' and of the school curriculum being sufficiently flexible to allow this and to cater for different rates of learning. This comment often was linked to the observation that additional time is required to consolidate some students' learning and to ensure mastery of content before moving to more advanced content. For example, one submission saw it as essential that students can 'progress at their own pace in learning areas such as mathematics and English where step-wise learning and mastery are critical'. For more advanced students and those making faster progress, 'teachers should have the flexibility to start work earlier and accelerate students'.

Maximising each student's learning also depended on engaging students' interests and passions. A number of submissions commented that all students can learn successfully if they are interested in what they are learning. For some, the implication was to 'make school more interesting'. For others, including those involved in a number of innovative programs described to the Review, the implication was to adopt more personalised and 'student-centred' approaches that empower individuals to discover and explore their interests. For example, it was explained that in 'Big Picture' schools, 'the first priority is for students to explore their personal passions and increasingly build their learning around these'.

Engaging and building on students' interests was described as another example of meeting individual learners where they are – not only in terms of academic attainment, but also in terms of personal interests and aspirations. Schools needed flexibility and time to respond to students' diverse interests, to 'let kids study what they enjoy' and to 'teach the things they're interested in'. It was argued by some that this became especially important in secondary schools where subject choices needed to be driven by an understanding of personal strengths and interests, and students needed to be able to pursue in-depth learning and future pathways matched to their individual passions.

Students not only differ in the points they have reached in their learning and in their varying interests and aspirations, but in many other ways as well. As one submission noted, 'there is now significant diversity within a cohort, with additional factors such as backgrounds, cultures and languages making the diversity among students greater than it has ever been before'. To meet every student's needs, the curriculum must provide flexibility to allow schools and teachers to respond to this diversity.

This includes room for schools to implement the curriculum flexibly in ways that suit their local contexts. Schools need to be able to adjust what they teach to 'take into account individual students' family, cultural and community backgrounds', as well as contextualising learning to help students appreciate its local relevance. This may be facilitated by closer engagement with the broader local community.

It also includes meeting individual learning needs through culturally inclusive and culturally responsive teaching practices. Submissions pointed out that many Aboriginal and Torres Strait Islander students and families experience 'a significant cultural gap' which directly impacts educational outcomes. But for many other students as well, attending school is a significant cross-cultural experience. The challenge of meeting every student's needs sometimes requires teachers to appreciate and build on the cultural knowledge and experiences that individuals bring to the classroom.

It was strongly impressed on the Review that the appropriate response to this great diversity of student needs was not to create separate curricula for different groups of students. It was essential that the mainstream curriculum was inclusive of all students, including students with special needs. Although the provision of something 'extra' and 'different' was often seen as appropriate and benevolent, separating some students out, streaming, and the lower expectations embodied in separate curricula and lower-level courses imposed 'artificial ceilings' on how far individuals could progress and often left them further behind. The clear preference was for a single curriculum that recognised students' differing levels of attainment and learning needs and that enabled 'appropriate adjustments to be made to teaching and learning' to ensure that every student was engaged, challenged at an appropriate level and made excellent progress towards high achievement.

The content and outcomes of the curriculum should be flexible to enable teachers to make decisions about what is learnt, how it is learnt and the time required to learn. This will allow teachers to differentiate and personalise learning to their students' needs and developmental progress, as well as to the school environment... Knowing students and how they learn is an essential skill of all teachers and requires an understanding of the diversity and complexity of learner needs... There should be opportunities to challenge high achieving students, support those students with various learning needs, and devise curriculum and pedagogy to meet the full range of students in our schools.

Association of Independent Schools of New South Wales/AHISA

The implications for teachers of this aspiration to see every student's learning needs being met were not lost on those making submissions to the Review. Understanding students' varying backgrounds and learning needs, differentiating teaching to address those needs, and making adjustments to ensure that every student is engaged and making good progress in their learning were recognised as significant professional challenges, particularly in secondary schools. They require high levels of subject expertise, cultural competence and professional judgement.

Another strong message through the submissions was that meeting every student's needs cannot be treated simply as a matter of effective pedagogy, with teachers being delegated responsibility for working out how to do this. The curriculum itself has a crucial role to play in enabling and supporting the kinds of teaching necessary to achieve this, both through its design/structure and the nature and amount of curriculum content. The curriculum must provide time and flexibility for teachers to plan and make decisions about 'what is learnt, how it is learnt and the time required to learn'. This means giving teachers greater agency and trusting them to make decisions in the best interests of individual learners. A number of submissions believed that this, in turn, depended on a curriculum that provided broad guidelines and allowed teachers to decide on detail, make adjustments and contextualise content for students in their care. And there was widespread recognition of the need to back this up with high quality professional learning, resources and other forms of support so that teachers are able to work in this way.

In summary, submissions to the Review were motivated by a desire to see every student's learning needs being identified and met, and every student making excellent, ongoing progress towards high attainment. The curriculum, through both its organisation and content, was identified as having powerful capacity to promote this aspiration, but also to undermine it. A key to achieving this shared aspiration – identified repeatedly in consultations and submissions – was for the curriculum to provide sufficient flexibility, time and space for teachers to identify and understand individual learning needs and to tailor their teaching accordingly.

3. COMMUNITY CONCERNS

Just as there was widespread consensus on broad purposes and aspirations for schooling and the school curriculum, there also was significant agreement in consultation meetings and Review submissions on obstacles and features of the current curriculum limiting the full achievement of these aspirations. Concerns centred on the volume of content contained in many syllabuses; increased expectations and demands on schools by governments, school systems and NESA; a lack of flexibility in curriculum structures to address adequately the widely varying learning needs of students; the influence that external tests and examinations have on approaches to teaching and learning; the dominance of ATAR as the pre-eminent measure of school learning in the eyes of students and parents; and the undervaluing of a broad range of courses and learning pathways other than those being pursued to gain admission to university. Inevitably, there were differences of opinion in relation to detail. However, there was overwhelming agreement that these six concerns must be addressed in any future redesign of the school curriculum.

Amount of curriculum content

The Review heard widespread concerns about the volume of content in most NSW syllabuses.

A consistent comment in consultation meetings and submissions was that syllabus documents expect teachers to cover an unreasonable amount of material. Syllabuses were regularly described as 'overcrowded', 'overly prescriptive', 'too content heavy', 'overly content driven', 'cluttered' and promoting a 'tick-box' approach to teaching.

In consultation meetings, one teacher commented, 'we need to get rid of masses and masses of content'; a second, that 'we need to remove 30 per cent of content from every syllabus – without exception'; and a third, that 'we could take half the dot points out of Human Society and its Environment syllabuses' with limited negative impact. Many teachers reported that they were struggling to teach the amount of mandated content in existing syllabuses.

Some believed the amount of syllabus content was a particular problem in primary schools. Others thought there was too much mandated content in the middle years of high school. Still others referred to the amount of content required for the Higher School Certificate. The Review also was given a variety of anecdotal accounts of reported consequences of 'overcrowded' syllabuses, such as a child being told to read as homework because there was 'no time to read at school' and a Kindergarten teacher claiming they 'didn't have time to teach nursery rhymes'.

A number of people referred to the role assessment processes play in driving this focus on detailed content coverage. Some spoke of needing to teach and assess all the dot points in syllabuses. Some referred to teachers' concerns that unaddressed dot points might later appear on HSC examinations. For example, one person said that teachers sometimes feel that 'if they miss a dot point in Year 7, they will be short-changing kids for success later in the HSC'. Some teachers believed that they had more freedom in the past and that teaching was 'now too linked to external assessment'.

The Review was told that many teachers, particularly in secondary schools, believe they are required to teach every syllabus dot point and so approach the syllabus as a 'checklist'; that early career teachers may be particularly reluctant to take risks by not covering all dot points; and that some teachers may believe everything in a syllabus must be covered to assign A to E grades accurately.

Participants overwhelmingly stated that there are too many dot points in the Mathematics curriculum. Some responses included comments such as 'overloaded', 'overcrowded' 'too much content' and 'shallow learning due to density, very little time to explore'. Participants reported that the amount of content is detrimental to mastery of concepts, and rewards 'book-learners and test takers at the expense of critical and creative thinking and problem solving'.

Mathematical Association of New South Wales

Some questioned whether teachers were over-interpreting what was expected of them. One submission referred to the distinction between real and perceived prescription. Another commented that, while teachers may believe syllabus content is mandatory, they often do not appreciate the flexibility available to them. Related to this was the observation that some teachers interpret examples intended only to illustrate outcomes as material that they are expected to teach. On the other hand, a number of submissions described ambiguity and a lack of clarity in syllabus documents that leaves teachers struggling to know what is mandatory and what is not. This was compounded by monitoring and inspection processes. One submission observed, 'The way the syllabus is presented, and teaching programs are monitored, makes teachers feel that they must cover all the dot points'. Another commented, 'There are numerous cases where areas of the curriculum are ostensibly optional, yet they are treated by NESA in its inspections of schools as mandatory'.

Teachers' attempts to cover the volume of prescribed content in subject syllabuses within the mandated hours were described as limiting their abilities to respond flexibly to the learning needs of students. The current level of detail and specificity 'hindered differentiation and personalisation' and the kinds of adjustments necessary to optimise the progress and achievements of individuals and groups of students. In consultation meetings, some teachers spoke of 'skimming content constantly' and 'bouncing from one thing to another' which led to students 'switching off' and left them without time to develop individuals' passions and strengths. It was argued that this level of prescription was 'not necessary to support qualified and accredited teachers' and undermined their professional judgements and expertise to make decisions in the best interests of students.

Another consequence of the current volume of content in syllabuses was the 'risk that content is taught only superficially', denying students opportunities to develop deep conceptual understandings of subjects. The current level of specificity was considered to stifle creativity and curiosity, student choice, teacher flexibility and the accommodation of local interests. Parents were concerned that the current approach does not allow for depth and consolidation of learning, especially in primary schools. One teacher said, 'There isn't the time and space for young people to get to higher level thinking like creating and applying, and evaluating, because of all the content that we need to cover'. And a parent organisation commented that students need time to explore and understand concepts, but 'the design of the current curriculum simply does not allow for this' because teachers 'are currently pressured to move from one outcome to the next too quickly'.

Various other consequences were identified, including the reduction of teachers' time to plan, refine and reflect on appropriate pedagogies; inadequate down-time in class for face-to-face conversations with students and to provide quality feedback; limited opportunities for professional discussions with colleagues; reduced time to monitor and see individual growth; and the 'blocking' of innovation in teaching. One teacher said, 'Ultimately, the issue is that we don't have time to do anything very well'.

A number of submissions referred to the impact current syllabuses are having on teachers. 'In trying to cover more and more content', it was claimed, 'we are overloading the students and the teachers and compromising the overall outcome'. Teachers were described as extremely time poor – a situation that had become worse in recent years. They were 'fatigued by trying to get the syllabus documents to work for students', burnt out, and in survival mode. 'Teacher and principal wellbeing is rock bottom because we have too much to do.' Teachers regularly called for more trust in their judgements and respect for their professionalism. One said that the curriculum reflected through its rigidity a lack of system trust in teachers. Another commented, 'Give us guidelines and allow us to be innovative'.

Some submissions suggested that concerns about the volume of syllabus content might also be addressed by minimising the duplication of material in different subjects. A degree of content 'cross-over' existed – for example, the teaching of plate tectonics in both geography and science – and that 'as much streamlining as possible' should be undertaken to minimise this. There were also concerns

about what was referred to as 'stage drift', with material that once was taught in one year level now being mandated in earlier year levels. This was described as resulting from recent syllabus reviews and it was speculated that this development was a response to concerns about declining/stagnating levels of student performance in national and international assessment programs.

More positively, some noted that a degree of prescription was likely to be helpful for beginning teachers, teachers in remote locations, and primary teachers who are required to teach across subjects and so may require additional support.

It was also reported that concerns about the volume of subject content were not relevant to all subjects. Some syllabuses, including newly developed syllabuses in primary History, Geography and Science, provided greater flexibility. Teachers also made positive comments about the level of content detail in current Music, Art and Stage 6 Biology syllabuses.

The curriculum is overcrowded. This affects everything from teacher workload to the ability of students to pursue their learning in depth. Any change must result in a less crowded and more flexible curriculum. There needs to be a balance between prescription and supporting teacher autonomy. We may have reached a point where teacher autonomy needs to be restored. We certainly do not need to go further down the track towards greater prescription and a compliance culture.

The History Teachers' Association of NSW (HTA)

In summary, there was near universal agreement that the amount of content in most current syllabuses needed to be reduced. As one school system's submission observed, 'the current suite of curriculum documents, including syllabuses, needs to be significantly redesigned'. This redesign needed to deliver more flexibility and appropriate oversight measures rather than the 'overwhelming and claustrophobic oversight' driven by current curriculum, assessment and credentialing requirements.

For some, this was a matter of changing the culture. NSW had chosen to develop syllabuses with a greater degree of detail than the Australian Curriculum by including additional learning outcomes, content descriptions and supporting information. But this syllabus approach to curriculum implementation continued 'a long tradition of prescription and control of schools and their activities for learning' and made it more difficult for teachers to create personalised learning opportunities. The Review was an opportune moment to reconsider this approach.

An aspect of any redesign must include 'paring back' the curriculum to focus on essential knowledge and deep understandings of core concepts, principles and big ideas in a discipline. These essentials must be 'defined unambiguously', clearly articulated and prioritised. It must be clear to teachers what is mandatory, and beyond this core, there must be 'opportunities for options and in-depth studies and projects', including opportunities for interdisciplinary/multidisciplinary learning activities.

Central to this redesign, it was argued, must be greater teacher discretion and agency in deciding what to teach and how to teach it. Teachers needed 'a clear sense of the 'big picture' or overarching long term outcomes' but required time and autonomy to pursue 'pathways to achievement' that they deemed appropriate for their own students. As one parents' association submission put it, 'the curriculum should be a broad overarching guide for all schools which sets overall benchmarks, and the pathway to reach the benchmarks is in the hands of each school'.

Increased expectations of schools

The Review also heard widespread concerns about additional expectations and demands that have been placed on schools and that further reduce time for quality teaching and learning.

A number of submissions observed that schools are now fulfilling functions that once were responsibilities of families and other institutions in society. Some described this as 'filling a vacuum' created by broader societal changes – particularly in relation to student mental health, wellbeing and the development of personal qualities.

Numerous references were made to other pressures resulting from decisions to delegate to schools responsibility for addressing various social issues. One person observed that schools had become 'the solvers of all of society's ills', with new issues constantly being added to the curriculum. The Review

was told that a recent scan of political announcements had identified a diverse set of issues that schools were now being asked to address, including 'anxiety/depression, resiliency training, childhood obesity, road safety, water safety, Asian studies, healthy school canteens, bush fire safety awareness, languages, cyber safety and anti-bullying'. Others mentioned drug education, first aid, stranger danger, healthy eating and pet safety. Additional programs of these kinds consumed significant teaching time and detracted from other aspects of teaching and learning.

While all these social issues were recognised as important, they were seen as contributing to a 'chopping and changing of the curriculum' in response to topical political issues and pressures from 'non-school bodies' and special interest groups. These changes were 'often made hastily and without proper consideration of the impacts on time, resources, funding or even the benefits of such changes'. When such additions were made, consideration was never given to what might be removed from, or deemphasised in, the curriculum.

There was a view that it should be more difficult for governments to add social issues of these kinds to the school curriculum and workload of schools. Some suggested that schools and teachers should 'push back' on expectations that they address issues better addressed by parents, allied health professionals or other organisations.

Other factors impacting on schools were new levels of accountability and compliance. These diminished teachers' time to deliver the curriculum and impinged on school leaders' time to support and lead teaching and learning. Some submissions described a recent change of culture in schools with the introduction of more 'managerialist' approaches. These were reflected in top-down oversight of the work of schools and increased administrative duties of teachers and school leaders. A focus on management, accountability and compliance was described as having replaced an earlier focus on professional development and support for teachers – particularly in interpreting and implementing the curriculum.

The implications of more devolved responsibilities and greater autonomy included a shift in principals' work away from teaching and learning to financial and other management issues. Increased requirements for school data analysis and reporting and other new accountabilities had seen an intensification of workloads and a reduction in principals' abilities to be 'instructional leaders'. Some reported becoming increasingly 'bogged down with governance and compliance'.

Increased administrative tasks also had impacted the work of teachers who reported having to comply with a growing amount of paperwork, 'red tape' and 'box ticking' and to 'attend more meetings and produce and comment upon more documents than ever before'. Excessive mandatory reporting, 'high stakes testing' and the 'burden of data entry' added to the time teachers spent on compliance and administrative activities. Requirements by NESAs, such as those related to teacher accreditation, were described as onerous and added to a 'vastly increased workload' that eroded teachers' time for purposeful thinking, teaching and professional learning.

Teacher workload is beyond the reasonable. Teachers were trained to deliver to students, but the existing paperwork processes are so time consuming that teachers spend more time focusing on making sure they look good on paper than whether they are being effective in the classroom. Being accountable is not a bad thing. However, this accountability has not improved student outcomes, but has created a huge 'other layer' on top of an already heavily loaded curriculum.

Careers Advisers Association of NSW and ACT

There were frequent references to a compliance mentality that now exists in many schools, driven by school registration inspection processes and various other accountability mechanisms. Schools were described as working in a high stakes environment in which there are 'many pressures on teachers to make sure they're ticking the boxes'.

The Review was provided with an example. There had been significant changes in teachers' programming (lesson planning) in recent years, with much greater detail now being included in teachers' plans. In some cases, it was reported, the writing up of a lesson plan 'would take longer than teaching the lesson itself', representing a huge drain on teachers' time. This practice did not appear to be required by NESAs, but instead reflected the detail that some principals and teachers believed was necessary for compliance and that would need to be produced if requested. One submission

explained that 'the inspection process has an impact on the expectations for this kind of programming documentation'. Several teachers told the Review that this documentation was 'put on file' in the school but sometimes bore very little resemblance to what they actually did in the classroom.

A consequence of increased accountability and compliance was that schools had become more risk averse. This sometimes led people to do more than was actually required of them – for example, making sure they taught all the dot and dash points in the syllabus. Some teachers said they felt this pressure: 'If I don't meet the hours on the timetable then we won't be a compliant school'. Such pressures were driven not only by NESA and its processes, but also by school systems and their various educational initiatives, which comprised 'another layer of complexity' for schools.

Working in an environment of accountability and compliance led some teachers to feel that their autonomy, expertise and professional judgement were not being respected or valued. As an indicator of this it was pointed out that content in the secondary curriculum was 'no longer a matter of guidance, but has become mandated'. One principal said that teachers described 'drowning under workload' and expressed concerns for their health and wellbeing. Another believed schools were losing many talented teachers to accountability fatigue.

In summary, submissions reported significant recent growth in expectations and demands on schools resulting from: the need to take on roles that once were responsibilities of parents and other institutions; directions from governments to develop and deliver school programs to address a variety of identified social issues; increased levels of accountability, including inspections linked to school registration; and a variety of administrative and compliance tasks, including assessment, data analysis and reporting. These additional expectations and demands on schools added to the challenges of overly content-laden syllabuses, increased pressure on already time-poor teachers, and detracted from the quality of teaching and learning.

An inflexible curriculum

Many submissions expressed concerns about a lack of curriculum flexibility to address students' very different learning needs.

The Review was told that, not only is there too much content in most syllabuses, but the school curriculum is often inflexible with respect to students' varying backgrounds and starting points. This inflexibility, which took a number of forms, was seen as hindering some students' abilities to learn successfully. For example, input to the Review from Indigenous groups described the school curriculum as providing learning opportunities 'targeted for children growing up in a Western culture'. This 'cultural/linguistic bias' made the curriculum inflexible in recognising and addressing Aboriginal children's different cultural and linguistic starting points and 'severely disadvantaged' many students.

Universal educational theory tells us that knowledge development is best achieved through teaching that allows students to build on prior knowledge, such as that learnt from one's family and community, prior to and outside of formal schooling. Before starting their schooling and outside of their school hours Aboriginal children are learning their Aboriginal languages, they are learning Aboriginal English and they are being immersed in, engaging with and learning through the oldest continuous culture in humanity. But, when they step onto Australian school grounds, they are subjected to a significant cultural shift where all too often there is little or no value placed on speaking Aboriginal Languages, Aboriginal English and practising and learning through Aboriginal culture.

NSW Aboriginal Education Consultative Group Inc. (AECG)

More generally, the Review was told that prescribed curriculum content often is not at an appropriate level for many of the students to whom teachers are expected to teach it. This lack of flexibility was attributed in part to the way in which the current curriculum is structured. Submissions pointed out that the curriculum is organised into year levels which are grouped into two-year 'stages' of school. Syllabuses specify what teachers are to teach and students are to learn in each year, with teachers deciding how that syllabus content is taught. In each year of school, students are assessed and graded on how well they have learnt what teachers have taught and then move, more or less automatically, to the next year.

Although this was a common and traditional way of organising the school curriculum and student learning, some submissions argued that this approach took inadequate account of the 'greater range of learning abilities that are now acknowledged in the modern classroom'. A number of people described the extent of this variability, citing research evidence that the difference between the least and most advanced students in each year of school was the equivalent of about six years of school. It was also observed that children begin school with widely varying levels of learning and development. One submission noted, 'there is now significant diversity within a cohort, with additional factors such as backgrounds, cultures and languages making the diversity among students greater than it has ever been before'.

In this context, there was concern that the curriculum lacked the flexibility teachers required to respond to students' widely varying learning needs. One person commented that teachers are 'required to teach at a particular stage linked to year levels, regardless of where kids are at'. Several likened the school curriculum to a 'quasi-industrial model' or '19th century factory model' that treats all students in the same way and 'batches them through by age', one year at a time. One person in a consultation meeting commented, 'we push students up a year level whether they are ready or not, rather than saying they haven't met a standard and working with them'.

Under the current curriculum, students are progressed from year to year regardless of how adequately they have met the outcomes or achieved the required learning foundations, or even if they have not achieved the outcomes or foundations at all. This does not acknowledge that individual students may vary dramatically in how they perform against the curriculum... As cohorts in schools are based purely on age, there can be enormous gaps in a single cohort in terms of the most and least advanced students. As these students are essentially required to progress at the same rate, there is little scope for teachers to adapt to these differences in one class.

Federation of Parents and Citizens Associations of NSW

This way of organising learning in schools was considered to have a number of consequences for students. These consequences included less advanced students often being expected to learn year-level content for which they were not yet ready – sometimes year after year. Examples were given of a little boy beginning school speaking at the level of a two year old but being put into guided reading and phonics instruction because it was part of the Kindergarten curriculum; students in stage 4 who were performing at stage 2 in literacy and numeracy but still had to be assessed on stage 4 outcomes; and students who were required to study mandatory content in English and mathematics for which they lacked the foundations because 'their work in the previous year was also introduced too early and little or no revision was possible'. Expecting students to learn content in the absence of the necessary prerequisites resulted in 'entirely unsurprising' failure on standardised tests such as NAPLAN. One teacher simply said, 'many kids are not ready for what we are trying to teach them'.

When students are inadequately prepared for what they are taught, many perform poorly on year-level expectations year after year and fall increasingly far behind in their learning. Under the current curriculum structure, one person observed, 'if you fall behind early on in schooling, there is no opportunity to catch up'. Another person described some students as 'always having a feeling of being left behind, and all the negative perceptions that go with that', and added, 'we need to be able to meet kids where they are'.

Another identified consequence of this way of organising teaching and learning was failure to challenge and extend more advanced students. One teacher said, 'we have kids in Kindergarten who can easily do Year 3 maths', but asked, 'are we giving them that opportunity?' Parents expressed concerns about 'teaching to the middle' and called for greater curriculum flexibility to allow teachers to extend student learning rather than 'mark time' for more able students. And another person commented that the most advanced students sometimes 'learn nothing from year to year because they learnt it three years ago'.

Members expressed a desire for flexibility around the content they should teach in each year. Currently teachers feel tied into teaching content to particular year levels regardless of the background knowledge of their students. If, for example, a teacher felt that there was a need to spend time reviewing content from previous years to better prepare their students for new learning then they should not feel under pressure to keep moving on. If they want to pause and consolidate students' prior learning, they should have the flexibility in the curriculum to do this.

Mathematical Association of New South Wales

There was a common belief that the 'current structure and specificity of the curriculum' does not cater for the diversity of students in each year of school. One submission described the existing curriculum as 'excessively rigid' and 'inflexible', making it difficult for teachers to tailor their teaching to individual student needs. A 'one-size-fits-all' curriculum encouraged a teacher-centred focus on delivering the same specified content to all students rather than engaging individuals with personally relevant learning. And one principals' association commented that organising the curriculum according to 'chronological age' raised 'all kinds of issues, frustrations and dilemmas for students, teachers and parents/carers', such as: What should teachers do if a student fails to achieve the stage outcomes? What if a student has already achieved the outcomes expected for their stage?

For some who made submissions to the Review, greater curriculum flexibility depended first on shifting the focus from every student's mastery of a common, specified body of year-level syllabus content to establishing the points individual students had reached in their long-term progress in an area of learning. This, in turn, depended on an appreciation of the continuity and course of student learning in a subject across the years of school. One subject association's submission commented that 'all curricula need to be able to show a clear progression through different stages of schooling, especially in linking the primary with the secondary... A clearly articulated framework of concurrent development of concepts, processes and skills would strengthen our curriculum'. One teacher told the Review, 'we should really be looking to change to a perspective of growth – delink from age level and meet students where the learning need is'.

A focus on continuity and progress in an area of learning was described as providing a 'K-12 perspective' on learning and development. In fact, it invited a view of learning that extended beyond the school years: 'A curriculum that reflects a continuum of learning recognises and leverages the fact that learning occurs both before and after a child's formal years of schooling. It is structured as a continuum across levels of learning achievement not years of schooling and provides for seamless transitions.' One teacher also observed that 'many of the skills we are developing are lifelong and not easily linked to a stage'.

Many people commented on the negative impact that transitions between stages and phases of school have on student learning. It was recognised that existing phases (pre-school, primary, lower secondary, senior secondary, tertiary education), along with the transitions between them, are 'artificial constructs' resulting from historical responses to growth in demand for additional education. They commonly involve different curricular and pedagogical approaches, and transitions between them often produce serious disjunctures in the progress of individual learners. Frequent references were made to discontinuities between pre-school and Kindergarten, primary and secondary school, and senior secondary and post-school learning. One submission from a principals' association described phases of school as 'working against a successful transition from one setting to the other, breaking the continuum of learning'. Another submission asked, 'Would an effective school system that has the learner at the centre really be designed in such a way?' and argued that all learners would benefit from a 'seamless curriculum' from pre-school to post-school.

At least one submission acknowledged that the current curriculum already provides 'quite a lot of continuity in syllabuses from K-10', but described a significant discontinuity between the lower secondary and senior secondary years. The introduction of new syllabuses for specific, stand-alone stages rather than as a 'suite' across the years of school also was seen as contributing to reduced continuity of learning. Another submission observed that current problems with transitions are not just from one phase of school to the next: 'Many problems are from 'year to year' because the entire curriculum is organised around a 'stage based' or 'year based' progression'. A curriculum that genuinely reflected a continuum of learning from pre-school to post-school would provide an opportunity to address current transition issues, as well as 'an opportunity for schools to think differently about how they structure themselves'.

Underpinning calls for a more flexible curriculum to meet the needs of all learners was an implied recognition that, at any given time, each student is at some point in their learning of a school subject and is capable of further learning progress if they can be engaged, motivated to make the required effort and provided with appropriate (well-targeted) learning challenges. This was considered to be true of every learner, from the least to the most advanced, including students with disabilities and learning difficulties. A curriculum based on a continuum of learning was described as an 'inclusive' curriculum because it recognised that every student was at some level of attainment on the same learning continuum and was designed to identify and meet each student's learning needs to enable them to make strong further progress in their learning.

Some submissions defined this as 'student-centred' teaching and learning. Central to this definition was a belief that what a student is taught should be determined by their current learning needs as established by their teacher, not by a central curriculum authority based on their age. The process of establishing a student's learning needs ideally would include the student's parents/carers and the student themselves. A principals' association commented, 'The ludicrous notion that all Kindergarten teachers deliver the same content and those same students are assessed in the same way is chronically outdated'. Another submission said, 'Learning must match the child's needs rather than the requirements of a school or a system, and teacher judgement is central to this process'. Those who advanced this proposition understood that it had far-reaching implications not only for the design of the school curriculum, but also for many other aspects of the work of schools.

One implication of this proposition was that it required teachers to establish where students are in their learning and to work to understand individual learning needs. This was recognised as a more difficult task for teachers than simply delivering the year-level curriculum to all students and then assessing to see how well they had achieved the same syllabus outcomes. It meant 'meeting students where they are' by identifying their current levels of attainment, interests, strengths and learning needs. A number of submissions referred to the value of classroom assessments in evaluating and diagnosing individuals' learning needs and deciding next steps in teaching. When assessments are used in this way, one submission noted, 'the teacher knows the entry behaviours of the child before they start teaching'.

Having established students' current levels of attainment, the challenge for teachers was to provide effective, well-targeted teaching and to work with students to set challenging goals for further learning. One submission observed that every student is entitled to know 'what they are going to learn, how they are going to learn it and how they will know they have learned it', adding, 'all good teachers know and understand this, but current structures mitigate against these practices'. In some cases, these practices require 'individual learning plans customised for each student'.

Another implication identified in submissions to the Review was that, as well as recognising that students are at different points in their long-term progress, there also needs to be recognition of – and curriculum flexibility to accommodate – students' varying rates of progress. Currently, there was considered to be 'little scope for students to meet the curriculum outcomes at their own pace or in ways that suit their own needs'. There needed to be flexibility to allow students who were capable of more rapid progress to move more quickly through the curriculum. At the same time, flexibility was required to provide extra time to students who needed it 'before having to move onto the next thing'. One submission observed that 'focusing on both hours and outcomes is a contradiction' and argued, 'Schools are best-placed to understand their student cohorts and make judgements about whether more or less time is required'.

It was also recognised that, for a variety of reasons – often beyond the school – students sometimes are not ready for the next steps in learning. Teachers occasionally find it necessary to address issues impeding a student's learning before they continue teaching. This also required curriculum flexibility. In addition, flexibility was required for students who were absent from school for significant periods. For example, Aboriginal and Torres Strait Islander students commonly engage in Sorry Business when there is a family or community death. 'This cultural practice requires students to be away from school for an extended period, sometimes up to three weeks.' A curriculum delivered on a fixed timeline to all students increased the likelihood of absent students falling behind in their learning.

The proposition that what a student is taught should be determined by their current learning needs as established by their teacher, rather than by their age or year of school, was recognised as having profound implications for the design of the school curriculum. A number of submissions addressed these implications directly, including by sketching features of a possible alternative design. A parents'

association urged the Review to consider how learning 'could be structured to ensure that the student is the focus in all classrooms and each student is working towards achieving their own personal learning goals and given every opportunity to reach their full potential'. Another submission observed that 'a serious commitment to personalising learning for every child means a disentangling from the current model'.

The curriculum content and outcomes should be organised more flexibly to reflect different paces of learning, instead of fixed age-based stages, to allow students to make good progress from whatever their starting points are and to support continuity of learning as an ongoing process. NESA requirements around mandatory hours, permissible starting dates, fixed assessment requirements, fine-grained registration and inspection requirements should be removed or amended to allow schools the flexibility they need to deliver the best possible education for each of the students in their care.

Association of Independent Schools of New South Wales/AHISA

A first, and key, step was to design the curriculum around increasing levels of absolute proficiency or attainment, rather than years of school. Various terms were used to describe this. Some submissions referred to increasing levels of 'competence' that are not tied to time: 'Competencies are competencies, like a driver's licence. It doesn't matter when you get it – it matters that you get it'. Some referred to redesigning the curriculum as 'learning progressions' and recommended that NSW 'move from a year-based curriculum to a curriculum expressed as learning progressions independent of year or age'.

Others described these as 'proficiency levels' and called for 'progression through school based upon the attainment of successive proficiency levels in individual subjects or key learning areas'. Another person used the term 'capabilities' and considered that New Zealand was setting a good example through a 'capabilities framework' that was not linked to school years, but allowed students to demonstrate mastery of capabilities 'and then move on'.

Common to all these suggestions was a vision of a restructured school curriculum, organised into absolute levels of attainment, through which students could progress at their own rates. One person in a higher education institution wrote, 'When arbitrary deadlines for all students to demonstrate fixed learning outcomes are in place, some students are set up to fail. Learners should be able to develop and demonstrate understandings and outcomes at times that are appropriate for them... Flexibility is a key characteristic of this type of vertically structured curriculum'.

A submission from another parents' association described in some detail how the restructuring of the curriculum into 'proficiency levels' might work in practice, including the proposal that higher proficiency levels 'reinforce and build upon the core knowledge, skills and competencies of the lower proficiency levels without rehashing the material of previous levels'; that 'judgement about readiness for any particular proficiency level should rest primarily with the child's teacher'; 'differentiation in classes would be based on a child's proficiency level'; and 'students who are struggling to meet a proficiency level would be given additional time, support and funding within limits'.

The implications for assessing student learning also were discussed. With a sequence of increasing levels of proficiency defined for an area of learning, teachers' assessments would be undertaken to establish starting points for teaching, provide feedback to students, and to decide whether a proficiency level had been attained. In this way, the results of assessments would be 'cumulative throughout school' making transitions 'more continuous'. One submission noted that, upon leaving school (even if that occurs before the end of Year 12), each student could receive a report showing the 'actual proficiency levels for all subjects studied'. It was also felt that this could 'remove some of the stress on the HSC as a high-stakes exam'.

P&C Federation proposes the following proficiency-based progressions as a model for a future curriculum, which has the following characteristics:

- Progression through school based upon the attainment of successive proficiency levels in individual subjects or key learning areas
- Each proficiency level contains an essential core knowledge, skills and competencies component with students only being able to progress to the next proficiency level by having demonstrated they have mastered the core elements
- Proficiency level trajectory based upon the minimum core competency trajectory that a student needs to reach at the end of schooling
- Students that master proficiencies early can traverse a steeper trajectory (within limits) by seeking to obtain higher proficiency levels
- Students remain in the age cohort to help promote normal emotional and social growth.

Federation of Parents and Citizens Associations of NSW

A number of submissions argued that, with the increased flexibility this approach would bring, assessments could be undertaken not at the same fixed time points, but when individuals were ready to be assessed and to demonstrate their achievement of a level of proficiency. One person said, 'There is a need to assess and report whenever it is timely, rather than in a 'lock step' way. So when students achieve outcomes, they should be able to demonstrate their achievement in a timely way and proceed to the next challenge that would be suitable for extending their capabilities'. It was considered that technology could be helpful in this process, with students undertaking online assessments at times of their choosing: 'Teachers must be given practical support by creating an online, formative assessment tool to help diagnose a student's current level of knowledge, skill and understanding, to identify the next steps in learning to achieve the next stage in growth, and to track student progress over time against a typical development trajectory.'

The construction of a sequence of levels of increasing proficiency in a subject, not tied to age or year level, also was seen as a way of building teachers' understandings of the nature of long-term progress in a learning area and their ability to support students who are at different points in their learning. A school system submission suggested that possible reasons for the decline in student engagement in the middle years of school included primary teachers' limited confidence in delivering the Stage 4 curriculum to students who have already mastered Stage 3 outcomes, and a perception by secondary teachers that 'uneven coverage' of the Stage 3 curriculum necessitated a 'recap' of that content. The submission observed that 'a shared understanding of all stages of the curriculum is needed for teachers to appropriately build on and extend their students' learning'. A submission from a principals' association also saw value in syllabus documents that could be used by both upper primary and lower secondary teachers: 'This would enable true learning progressions in the vital middle years where the learning outcomes could be properly tracked. There would also be greater scope for dialogue between the primary and secondary school settings, using a common language.'

Some submissions made the point that restructuring the curriculum did not imply restructuring schools (for example, grouping students according to their levels of attainment rather than by age). There were good social reasons, some argued, for keeping most students with their age peers: 'For the majority of students, especially in their teenage years, they do not want to stand out from the crowd. They want to move through school with their peers and be able to experience the various social stages of development with them.' Rather, the challenge was to break the current nexus between the structure of the curriculum and the structure of schools, and to develop a curriculum structure that better supported teachers to address the widely varying attainments and learning needs of students within each year group.

In summary, calls for a more 'flexible' curriculum were among the most common requests presented to the Review. A reduction in the volume of syllabus content would increase curriculum flexibility and teachers' abilities to address individual learning needs. But for many people, greater flexibility also depended on changing the curriculum structure so that teachers were better able to target their teaching on individual learning needs and to set appropriately challenging goals for every student's learning. One way to restructure the curriculum would be to define a set of proficiency (or attainment) levels that are independent of age and year level. It was recognised that such a change would have implications for teaching, learning, assessment, reporting, and professional learning and support.

External tests and examinations

The Review also heard concerns about the negative influences of external tests and examinations on teaching and learning in schools, particularly Higher School Certificate (HSC) examinations and the National Assessment Program – Literacy and Numeracy (NAPLAN).

Concerns about HSC examinations were part of a set of interrelated concerns raised with the Review about curriculum and assessment arrangements in the final years of school, others being the dominance of ATAR as a measure of school achievement and the undervaluing of pathways other than those designed for entrance to university.

A number of submissions referred to the HSC as an 'internationally recognised credential'. There were relatively few concerns expressed to the Review about the content of particular HSC syllabuses. However, there was a view that the HSC was 'too prescriptive'. More specifically, a number of submissions called for the relaxing of the current requirement that, to be eligible for the HSC, students must complete ten units of study. This requirement was described as being 'based on assumption, rather than valid justification'. Some submissions proposed that the requirement be reduced to eight units of study, enabling greater depth of learning. One called for 'increased flexibility in attaining the HSC through removing mandatory units and hours and allowing schools to have greater choice to accommodate their school community'. Beyond the concern about the mandatory number of units and hours of study and the desire for greater flexibility, most concerns about the HSC related to the examinations. One person advised the Review, 'Don't change the HSC, change the exams and ATAR'.

A frequently expressed concern was that written examinations, by their nature, are not capable of assessing the full range of learning valued in HSC subjects. This was described as having a distorting effect on teaching and learning, giving undue emphasis to 'content', 'knowledge', 'rote learning' and 'exam skills' at the expense of encouraging project-based and problem-based skills in applying knowledge. One subject association referred to this as a '19th century approach to assessing learning'; another subject association described it as 'a centralised assessment regime that, despite internal assessment, still focuses on a Wyndham era external HSC', and added, 'As we move further into the 21st century there will be increasing pressure to review this approach'.

Some described HSC examinations as constraining teachers' abilities to teach in more responsive ways and to incorporate 'real-world relevance'. One person said that schools work to develop creative, innovative thinkers until that effort has to be put on hold to prepare students for HSC examinations. Another observed that project-based learning and a focus on '21st century skills' was an emphasis in Year 7, but declined throughout the secondary years because students 'have to sit an exam which is largely content-based rote learning questions'. A third person said there was no point in teaching '21st century skills' and the use of technology and then, at the end of schooling, 'giving them a paper and pen exam for three hours'. And a fourth described the stronger inquiry and investigative approach in new Science syllabuses as 'great', adding 'but we're still stuck with the HSC external exam. We can't get changes in senior subjects with the external exam still sitting there. Kids are reporting that they don't see the value in it'.

Reference was made to developments in Extension 2 courses where students 'have the agency to pursue an individually chosen aspect of study that is significant, conduct independent research, work with universities and industry experts and sit an examination that allows them to take their research material in with them'. These developments were viewed positively and seen as a possible way forward in the development of HSC examinations.

For years now, NESAs and its predecessors have acknowledged that external examinations do not reflect the breadth of each examined subject. Changes in technology and what is valued in life-long learning such as agency, collaboration, investigation, critical questioning, creativity are not adequately, if at all, assessed in an examination context. While much effort and money is being spent on trying to bring standardised testing into the 21st century, the HSC fails to do what assessment should: assess student learning of a particular subject. More externally moderated school-based assessment could be designed to value learning processes and dispositions.

English Teachers Association NSW

Another concern was that HSC examinations were promoting an approach to learning as 'memorisation', 'rote learning' and 'regurgitation', which worked against deep learning. A number of submissions described an HSC examination 'culture' in which students were being 'coached' to pass examinations. One professional association reported that students entering university appeared to have 'an engrained exam-passing culture' and called for the removal of 'the current focus on teaching to pass examinations'. A teacher described how students can spend many months preparing and reworking a piece of creative writing on the basis of feedback from teachers so that it can then be memorised and reproduced under examination conditions. A principal described HSC examinations as 'plagued by gaming, plagiarism and academically shallow learning'. Others had suggestions of strategies for addressing these concerns, such as allowing students to take prepared notes into examinations 'to remove the need for memorisation and focus instead on problem solving and the application of knowledge and skills'.

There were also concerns about unhealthy and inappropriate levels of stress associated with HSC examinations. Teachers described over-anxious and overly stressed students who often saw the one-shot, end-of-school examinations as determining their futures. One said that 'students see themselves as their HSC result' and often wonder what all the pressure was about once they leave school. A parents' association submission commented, 'Apart from the questionable relevance of the HSC written tests to vocational or direct to work candidates, the heavy emphasis on the HSC leads to a great deal of anxiety and other mental health problems for many students'. A prominent businesswoman remarked, 'The curriculum needs to provide challenge but not unproductive pressure. The current HSC process is an example of unproductive pressure'. And a university submission added, 'Improved methods of assessment, particularly those that minimise stress on students and do not distort performance, would be desirable if they can be demonstrated to be a reliable indicator of attainment'.

Parents and carers have expressed to CCSP on many occasions that NAPLAN and the HSC are assessments that raise serious health and welfare concerns for students, especially in relation to stress and anxiety. The HSC has been in existence for decades and thousands upon thousands of students have sat the HSC since it was first introduced in 1967. So why then are students struggling more than ever with mental health issues associated with the HSC? ...

The time has come to have a look at the HSC and consider what needs to change so that final exams do not come at the expense of the mental health of our students.

Council of Catholic School Parents NSW/ACT

The Review was told that HSC examinations influence not only the final years of school, but also much of secondary schooling. Teachers described the HSC as impacting on teaching and learning throughout the secondary school and 'down into primary'. One said, 'We're teaching to the HSC exam from Year 7 upward'. Others described it as looming large in the consciousness of teachers and students, influencing students' choice of subjects and teachers' decisions about what to teach. This often impacted negatively on the breadth and depth of teaching and learning. One teacher explained, 'There's the idea that if I don't teach it in Year 7, they will miss out when you get to HSC'. As a result, one submission observed, 'in the context of the HSC, suggestions about treatment of content (for example, content elaborations) can be treated as mandatory in effect'. Another teacher said that if students ask why they have to learn something in secondary schools, the answer is the HSC.

HSC examinations also had an influence on schools' approaches to assessment, with students regularly being administered tests similar to those they would encounter at the end of the schooling process. In the senior years of school, examinations exerted a particularly strong influence, impacting on schools' curriculum choices and students' experiences. Minor changes in examination content were reflected in immediate changes to how students were prepared for the HSC. One person observed that 'opportunities for collaboration and other ways of doing things are being missed because of an excessive focus on HSC examinations'. Others expressed concerns about the examinations promoting a competitive rather than collaborative learning culture, between schools as well as students.

On the other hand, the Teachers Federation submission described the current NSW model as providing 'high standards in the HSC examination, alignment between what is taught and what is tested and community ownership of these fundamental processes that blend excellence and equity'.

A number of submissions referred to the 'high stakes' now associated with NAPLAN results and the impact this is having on classroom teaching. One subject association commented that, just as external testing and the reporting of school results in the HSC restricts pedagogy and the richness of content, 'the external publishing of NAPLAN data with its simplistic rating of schools based only on standardised testing outcomes is counterproductive to learning'. The Review was told of pressure teachers felt to prepare students for NAPLAN. This included decisions to teach material that some students were not yet ready to learn because it would be covered on the test. There was a widely held view that the publishing and comparison of school results had changed schools' approaches and made NAPLAN performance a higher priority for systems, schools and teachers.²⁵ Some contrasted this with the earlier Basic Skills Tests. Others referred to the 'unnecessary stress' that NAPLAN now creates for families and students.

Some submissions argued that NAPLAN results should not be used for public comparisons and judgements about teacher and school performances, but should be used only for within-school and diagnostic purposes. For example, a subject association argued that 'publicised results create a type of league table that warps the ways that schools approach NAPLAN, including teaching to the test, rather than using the information as a way of seeing where students are in their academic journey every two years'. Another subject association believed that, if NAPLAN were not used for high stakes purposes, it had 'the potential to be a very effective tool in identifying students who need assistance to strengthen, or extend, their learning and level of knowledge'.

Another major diversion from providing young people with the curriculum and breadth of human possibility they deserve comes in the form of the hugely negative impact testing and reporting processes such as NAPLAN, A-E reporting and My School have on the actual curriculum that is emphasised in the classroom. One cannot seek to reform the curriculum without regard for the distorting effects such mechanisms have on the actual time that remains for rich, student-centred learning.

The Australian Education Union NSW Teachers Federation Branch

In summary, while external tests and examinations were sometimes described as 'transparent, consistent and arguably less open to socio-economic bias than other forms of assessment', and were sometimes seen as more 'equitable' than other forms of assessment because all students sat them under identical conditions, they were commonly described as narrowing the focus of teaching and learning to what is tested, causing unacceptable stress in some students, and potentially promoting unhealthy competition between students and schools.

Dominance of ATAR

The Review was presented with a range of concerns about the impact ATAR was having on teaching and learning in schools, including concerns about its distorting influence on students' subject choices, its creation of hierarchies of school subjects, its overshadowing of HSC results, and its impact on the perceived value of post-school pathways other than university entry.

Many people referred to the powerful and dominating role ATAR plays in the consciousness of students, parents and many teachers. It was observed that 'ATAR is still often seen as the ultimate goal for students and their families'; that learning at school is about 'getting results to get an ATAR'; that 'students feel intense pressure to get the highest ATAR possible'; and that, for many students, ATAR is closely tied to self-esteem. This was widely seen as a problem that needed to be addressed. In its submission to the Review, the Universities Admissions Centre (UAC) wrote, 'It seems beyond doubt that there is too much pressure on students to get a high ATAR, and the education sector and the community as a whole need to come together to reduce that pressure'. In consultations for the Review, people often referred to the pressures of 'HSC and ATAR' jointly, interpreting HSC examinations as the necessary prerequisites for the construction of ATAR.

²⁵ A NAPLAN Reporting review commissioned by the COAG Education Council, undertaken by Professor William Louden and released in June 2019, concluded that many school education stakeholders are concerned that publishing school-level NAPLAN data had made the tests 'high stakes'. (<http://www.educationcouncil.edu.au/site/DefaultSite/filesystem/documents/Reports%20and%20publications/NAPLAN%20Reporting%20Review/Final%20Report.pdf>)

Submissions expressed concern about the influence ATAR was having on teaching and learning in secondary schools. As well as functioning as the ultimate measure of thirteen years of school, ATAR was described as a key influence on 'how teachers teach and how students learn'. It led students to choose subjects not on the basis of individual interest or aptitude, but on beliefs about how ATAR might be maximised – for example, by choosing 'easier' HSC subjects over 'harder' subjects. Although these beliefs were strongly refuted by UAC, there were numerous references to attempts by students, parents and teachers to 'game' ATAR in the hope of increasing students' ranks and thus chances of being admitted to their course of first choice. Decisions to avoid 'harder' STEM subjects in favour of 'easier' subjects were described by the Australian Chief Scientist as a 'malign influence' of the current ATAR system. And a university observed that students' post-school course options were sometimes being undermined by subject choices made at school in an effort to maximise ATAR.

A concern was expressed that ATAR also imposes a hierarchy on school subjects through its rules about which subjects can and cannot be included in its calculation. 'Courses related to Early Childhood Education and Care, plumbing, recreation and sport, and screen and media, can all be studied as part of a student's final two years of schooling, but are delegitimised through their exclusion from tertiary admission rankings.' The categorisation of these courses as 'Category B' or 'Board Endorsed Courses' was seen as implying that they were 'less important or worthy' and was considered to leave NSW at risk of an 'acute skills shortage' as students continued to move away from vocational studies in their final years of school.²⁶

Other 'perverse impacts' of ATAR were identified. These included students' decisions to enrol in post-school courses not because they were aligned to students' strengths and interests, but because students and their parents were reluctant to 'waste' a high ATAR on a course that did not require it. In this sense, ATAR was also being treated as a measure of the quality of post-school courses. As a result, the quest for high ATARs was having 'the unfortunate consequence of negatively affecting students' school experience, pathway decisions and ultimately, career paths'. Beyond this was 'growing evidence that the perceived importance of the ATAR and academic achievement is having a negative effect on school engagement, overall wellbeing and mental health in the HSC years'.

Some submissions drew attention to the use of ATAR by schools as a marketing tool, its use by employers as evidence in employee recruitment, and by the media as a convenient basis for stories and headlines. It was noted that ATAR was not designed or intended for any of these extraneous purposes and that better explanation of its uses and misuses was required.

There were a number of calls to reconsider the relationship between the Higher School Certificate and ATAR. Underlying these calls was a desire to see the end-point of schooling 'not dictated by university entrance'. A principals' association commented that the HSC's 'nexus with the ATAR and University Entrance has become a problem' and believed that 'reinstating student pride in their HSC achievement would be a positive step'. A number of people commented on the fact that the end-game for many school students was university entrance and that students who received early offers – which sometimes occurred early in Year 12 – often disengaged at that point from their HSC studies. This was described as another current problem in some schools.

Decouple the ATAR from the final years of schooling by revitalising and re-emphasising the HSC as a final credential that celebrates and recognises the attainment of skills and capabilities. Consistent feedback from both businesses and our engagement with young people suggests that the current emphasis on the Australian Tertiary Admission Rank (ATAR) over the final years of schooling is having a negative impact on student development and the alternative learning pathways. The focus on ATAR can substantially derail the 'education' component of the final years... While the ATAR was designed for universities to sort and select students, it has evolved to have a much broader reach with many students and parents seeing it as the key way of measuring success at the end of school.

NSW Business Chamber

²⁶ Category B courses can be included in the ATAR calculation, but no more than two units in a total of ten. Board endorsed courses are not included because they do not have common examinations.

The Review was told that, despite the introduction of a more demand-driven system in higher education, with some universities now more focused on student recruitment than student selection, 'some courses and even some universities' had a continuing need to manage competitions for limited numbers of places. For these courses and universities, ATAR was a highly efficient 'sorting and ranking mechanism'. UAC produced ranks for 50 000 students every year.

But it was also noted – including by some universities and UAC itself – that 'ATAR as the only admission requirement is now in diminished use and is being supplemented by other indicators'. References were made to the 2018 Mitchell Institute report, *Crunching the Number*, and its observation that only one in four students entering Australian universities was admitted on the basis of their ATAR.²⁷ 'Early offers, aptitude tests, special entry schemes or VET award courses were all alternative options to enter university.' Many people referred to the fact that less than 30 per cent of all university admissions were based on ATAR and that there were now many other ways to gain entry. In a meeting with staff of one university the Review was told, 'If there was an opportunity to remove ATAR, as a faculty we'd encourage it, seeing that the correlation between achievement and what students bring has absolutely nothing to do with ATAR; it's about level of curiosity and willingness to commit to the process of learning'. A parents' association believed the challenge was to 'educate students, parents and the community about the many pathways to success, and also the many pathways to university beyond an ATAR'.

UAC pointed out that, although it was not widely understood, students are admitted to courses on the basis of their UAC Selection Rank, not their ATAR. The Selection Rank is calculated for university courses separately and, for many applicants, includes additional evidence such as interviews, portfolios, additional tests and school recommendations. The use of such additional evidence by universities had been growing and, together with the use of bonuses, meant that a student's Selection Rank could be different from their rank by ATAR. Looking to the future of the Selection Rank, UAC anticipated that 'performance in specific courses or disciplines could be used, or the ATAR could be calculated differently or broken up into a number of rankings for different fields of study'.

In summary, while it was recognised that there is a continuing need to select students for entry into some higher education courses and institutions, there were widespread concerns about the way in which ATAR dominates the efforts and attention of students, parents and teachers in the final years of school. This was seen as undermining the HSC credential, undervaluing particular school subjects and post-school pathways, and having a distorting effect on students' choices of school subjects and university courses. Although many students aspire to an ATAR, and UAC continues to produce a rank for 50 000 students each year, students now enter universities on an increasing range of evidence, with ATAR being one of a number of inputs (albeit a significant one) to the calculation of course-specific Selection Ranks.

Senior years curriculum

The Review was presented with a range of concerns about the curriculum in the final years of school, mostly related to its perceived over-emphasis on preparing students for university at the expense of providing all students with a broad preparation for post-school study, life and work.

A regular comment was that the increase in the school leaving age from 15 to 17 in 2010 was not accompanied by the necessary curriculum changes to cater for the full age cohort. Instead, the expectation was that the vast majority of students would now undertake the Higher School Certificate and pursue an academic pathway. One person commented that 'since we raised the school leaving age, the focus moved to ATAR for all students'. One submission observed that, although more than 60 per cent of the age cohort did not go to university, 'the curriculum places the attainment of an ATAR and university entry as the default indicator of success, irrespective of the needs and interests of individual students'. In this sense, the current senior curriculum was considered by some to be 'unintentionally elitist', with the HSC still being 'incredibly skewed as a tool for university entrance'. Another person argued that 'the HSC is overwhelmingly designed to meet the needs of students who plan to progress to higher education' and called for the senior curriculum to be redesigned to 'benefit all students in their final two years in a classroom regardless of their post school destination'.

²⁷ This figure applies to all admissions, not only Year 12 students. Approximately 80 per cent of Year 12 student admissions use ATAR, either on its own or in conjunction with other evidence.

A number of submissions commented that the prioritisation of university preparation in the final years of school meant that the learning needs of many students were not being met. This included not providing 'appropriate learning environments' for some students and requiring others to take subjects that did not 'suit their learning abilities or interests'. One submission believed it was 'time to acknowledge that students with a much broader range of abilities are completing their HSC and we are not undertaking best practice to prepare all students for further education and work'. Another commented that 'the changing needs of students undertaking senior schooling and opportunities in the workforce are not being reflected in many of the offerings provided by the school education system'. And a third submission noted that 'both the curriculum and wider school system are subsuming the needs of students in favour of pathways geared towards university'.

Many submissions referred to the continuing priority being given in schools to the 'traditional academic pathway' from HSC study to ATAR to university entry. Other pathways were commonly treated as 'alternative' or 'non-academic'. It was noted that not all schools had embraced the introduction of VET courses, and 'non-ATAR' patterns of study were 'struggling for acceptance' in many schools. This was exacerbated by the hierarchy currently imposed on school subjects by university rules concerning ATAR. A parents' association submission observed that 'there is sometimes a bias amongst teachers/schools regarding VET, which is sometimes seen as inferior to ATAR/tertiary preparation'. In a public consultation meeting, one person commented that the 'stigma' often associated with vocational learning in schools needed to be addressed. And it was noted that, while VET subjects remained relatively popular, with almost one third of students including a VET subject in their pattern of study, the number of students taking VET subjects had decreased sharply from 60 775 in 2013 to 50 165 in 2017.

Despite a large portion of Year 12 completers not entering university after school, there is an implicit assumption throughout the entire curriculum that all students aspire to go to university immediately upon finishing school. This assumption is apparent in the curriculum's disproportionate focus on academic achievement and on preparation for university study, while vocational options receive considerably less focus and are thus implicitly treated as inferior to academic pursuits. This essentially means that students who wish to enter university after school get considerably more support and preparation under the current curriculum than students who would prefer to undertake vocational study, start apprenticeships or enter into the workforce after school.

Federation of Parents and Citizens Associations of NSW

There were numerous comments about current VET arrangements in schools. Although these arrangements were considered to work well for many students and were in general 'highly desirable' and 'highly valued', hands-on VET courses delivered by schools and external providers were described as more expensive for schools and for students than traditional academic offerings. VET delivery also was 'complex and cumbersome' and compliance requirements of the Australian Skills Quality Authority (ASQA), NESAs and the Department of Education placed 'an undue burden on schools in terms of time, teacher training, resourcing, and administration, and on VET teachers who are being overburdened with requirements'. Industry requirements, including the requirement that teachers update their qualifications whenever ASQA approves an updated industry package, were seen to be adding to the burden on schools and 'burning teachers out'.

Concerns also were expressed about the variable quality of current VET offerings in schools, with one submission stating that 'as a part of the NSW curriculum, VET must meet the principles of rigour, coherence, depth and aspiration'. Another submission called for the prioritising of higher (Certificate III) VET courses and for 'eliminating' lower level (Certificate II) courses, especially in the final years of school. One submission told the Review that VET courses often provide insufficient work placement or on-the-job training when compared to standard post-school VET delivery, and that 'industry tends to hold a low view of school-delivered VET for producing students who are not job-ready compared to the training delivered by TAFE and other industry-based RTOs'.

A number of submissions commented on school-based apprenticeships and traineeships (SBATs). These were considered valuable for some students, but there were concerns that SBATs required significant time and effort to complete and, unless they were part of Board Developed courses, did not contribute to an ATAR. This was seen as one cause of the historically low levels of enrolment in SBATs. Another cause was a lack of flexibility to accommodate required workplace hours in school timetables, which made SBATs less attractive to employers, students and parents. The Review was also told of research showing 'systemic weakness with the current SBATs model' which, rather than preparing students for the 'high skill and high-earning roles our economy needs', often locked disadvantaged students into narrow and 'precarious' employment pathways.

The IEU believes that VET education as it is currently structured and resourced in NSW is less than satisfactory. If ASQA cannot be removed from the equation NESA should be authorised to operate it on their behalf. VET in specialist schools works reasonably well. In a comprehensive high school, it is complex in terms of different assessments (competencies), work placement and credentialing. The pedagogy underpinning VET is at considerable variance to that of other HSC subjects. VET teachers are currently required to undertake industry currency retraining every two years. This is mandated at 30 hours per framework. This is burdensome and cumbersome and, in our view, ineffective and unnecessary.

Independent Education Union of Australian – NSW/ACT Branch

There were widespread concerns about the consequences of current senior secondary curriculum arrangements for some students. The Review was told that 26 per cent of young Australians do not attain either a Year 12 certificate or a Certificate III equivalent qualification by age 19. Among those from low socioeconomic backgrounds, the figure was 40 per cent, and among young Indigenous people, 56 per cent. Concerns frequently were expressed about the number of young people leaving school 'without the skills to sufficiently prepare them for success in future employment and life'.

Some of these students were described as 'drifting on to nothing'. This was a particular concern for parents in rural communities who called for better pathways for disengaged school leavers. The Review was told that more than 14 per cent of all young Australians aged 15 to 24 were not in full-time education, employment or training – the highest level since 2010.

There were also concerns about the under-preparation of students who moved directly from school into work. In 2016, 22 per cent of NSW school leavers were either in full-time or part-time employment and not studying. It was argued that, for these students in particular, schooling must provide 'the skills they need to make the successful transition directly into the labour force'. A number of submissions questioned how well the current senior curriculum was doing this. For example, it was claimed that 30 per cent of 15 to 24 year olds want more work but are unable to find it because they lack the skills required for the workforce. This suggested 'a continued shortcoming in the ability of the education system to adequately prepare students for employment, particularly when considering the changing nature of work in Australia'.

Submissions also expressed concerns in regard to the 19 per cent of NSW school leavers who go from school to post-school VET studies (Certificates I to IV, apprenticeships or traineeships). Not only were these vocational pathways undervalued by schools, but the vocational education sector itself was described as 'in decline'. There were references to the 'erosion' of TAFE as the major provider of vocational education. Some called for the strengthening of TAFE and saw this as a key to ensuring 'Australia's workforce has the depth and breadth required for its future economic and social sustainability'.

There were also concerns about the quality of advice available to students about school pathways, post-school options and future career possibilities. Current careers education was described by one person as failing to 'inform, engage, advise or prepare students to enter the workplace'. Students needed to understand that university was not 'the only path to a rewarding career' and that there were pathways other than ATAR to enter university.

The Review was told that students in the senior years required better information about the expectations of employers and the ways in which they could work towards valued qualifications over time. (In this context, the Record of School Achievement (RoSA) was described by parents as a relatively meaningless credential that simply confirmed that a student had attended school and carried little weight with employers. Many students were said to be 'not printing the credential at all'.) One person commented that 'engagement can be improved if young people can see where their learning is taking them – into a well-articulated career pathway'. And a number of submissions reminded the Review that the ultimate purpose of the senior curriculum is not university entry or preparation for the workforce, 'but to produce well rounded students who are good people and active citizens'.

In summary, concerns about the senior years curriculum centred on its current bifurcation into a valued, dominant 'academic' curriculum and an under-valued, 'alternative' vocational curriculum. This dichotomy was described in various terms, including: academic versus vocational; abstract versus technical; and institutional versus real world. The Review was encouraged to explore ways of reducing or eliminating these distinctions and ensuring that every student in the final years of school received an excellent preparation for ongoing learning, life and work. One teacher said, 'If we just change the HSC, people will find ways to reinvent it. The change needs to be more fundamental'.

Submissions made a variety of suggestions for improving curriculum arrangements in the senior years. These included minimising possibilities for narrow, instrumental learning (for example, to maximise ATAR or to prepare students for specific jobs that may or may not exist in the future) and ensuring instead that every student engages with a broad, rigorous, high quality senior curriculum that prepares them for post-school study, life and work.

This curriculum should provide the flexibility for every student to build on their strengths and pursue their passions and interests. Some suggested the curriculum could be 'modularised' to allow students to design more tailored learning programs leading to valued credentials, including possible 'micro-credentials' linked to individual modules of learning. High quality senior subjects should incorporate the possibility of students undertaking study with external providers, including TAFE and universities, and to accumulate credit while at school towards post-school qualifications. Where relevant, these should include workplace experiences.

Submissions also described a need for better links between the senior years curriculum and post-school destinations (workplaces, vocational education providers and universities). Improved partnerships with industries would assist in enhancing the relevance of learning, clarify learning pathways and career opportunities, and provide opportunities for increased industry engagement in the work of schools. As an example, the Review was briefed on initiatives and programs of Engineers Australia to support student learning and teacher professional development relevant to the engineering profession. Secondary principals also made favourable reference to 'distinction' courses provided in the past by universities, said that they would welcome links of this kind being re-established, and strongly advocated 'a more fluid connection between the final year of school and entry into the world of university'. A general point made in a number of submissions was that there was a need for greater continuity and seamlessness of learning across the transition from school to post-school destinations.

4. GUIDANCE FROM LEARNING RESEARCH

In recent decades, significant research has been undertaken into human learning and the conditions that promote successful learning. This research has spanned a range of disciplines, including neuroscience, cognitive science, educational psychology, educational research and sociology, and has resulted in a relatively new interdisciplinary field of inquiry commonly referred to as the 'science of learning' or the 'learning sciences'. Several major reviews have summarised the state of knowledge in this field. Many of the field's research findings have implications for learning in schools. A few of these findings are summarised here.²⁸

New developments in the science of learning raise important questions about the design of learning environments – questions that suggest the value of rethinking what is taught, how it is taught, and how it is assessed.²⁹

Deep understanding

One group of research studies has explored the characteristics of 'experts' in various fields such as mathematics, chess, science, medicine and history in an effort to identify what develops as people become more expert in their fields and so to establish what distinguishes experts from novices.

A general conclusion from these studies is that experts have a great deal of knowledge in their fields. Their extensive factual and procedural knowledge is an important component of their expertise. However, importantly, this knowledge does not exist in the form of disconnected facts; expert knowledge is interrelated and organised around deep understandings of important concepts and principles of the field.

Experts' deep understandings of their field make their factual and procedural knowledge more 'usable' in the sense that it can be transferred and applied more readily to new and unseen situations. Experts are better able to make sense of new information, including by recognising features, patterns, relationships and discrepancies that are less obvious to novices. Research shows that novices in a field are more likely to represent newly encountered problems in terms of their surface features, while experts attend to deeper, more abstract concepts, principles and processes that underlie surface features. Other research has shown that novices tend to possess knowledge in smaller, disconnected pieces, while experts possess larger, more integrated 'chunks' of knowledge that assist them in identifying meaningful patterns in information.

Experts' deep understandings also provide them with better appreciation of the contexts to which knowledge can and cannot be applied (that is, their knowledge is 'conditionalised') and deep conceptual understanding enables them to retrieve facts more readily from memory, to learn related information more rapidly and to think about and solve novel problems in their field.

These expert/novice studies show that the simple accumulation of knowledge and the memorisation of facts and procedures are inadequate for analysing and solving significant new problems or tackling complex challenges. Activities of those kinds require deep understandings of a field developed over many years through exposure to a wide variety of related problems and challenges.

²⁸ This section draws on a paper prepared for the Curriculum Review by Ms Charlotte Waters titled '*Findings from the learning sciences: implications for curriculum, instruction and assessment*', Australian Council for Educational Research, 2019.

²⁹ J Bransford, AL Brown, RR Cocking, MS Donovan & J Pellegrino (eds), *How people learn: brain, mind, experience, and school: expanded edition*, National Academies Press, Washington DC, 2000, p. 131.

This research also has shown that expertise in one field does not transfer readily to expertise in another, even when fields appear closely related. For example, it might seem that 'problem solving' should transfer across fields of expertise. But research has found that experts behave much like novices when faced with problems outside their fields. Expert problem solving appears to depend on understandings that are largely field-specific.

These findings have obvious implications for the school curriculum. Students' abilities to transfer and apply their factual and procedural knowledge to new contexts and problems depend on their grasp of underpinning concepts and principles in an area of learning, opportunities to apply their learning to a wide range of contexts and problem types, and extended time frames in which to do this.

The fact that experts' knowledge is organised around important ideas or concepts suggests that curricula should also be organised in ways that lead to conceptual understanding. Many approaches to curriculum design make it difficult for students to organise knowledge meaningfully. Often there is only superficial coverage of facts before moving on to the next topic; there is little time to develop important, organising ideas.³⁰

Motivation

A second body of research has explored the role of motivation in learning. These studies have investigated different ways of motivating learning; learners' varying reasons for engaging in learning; beliefs about personal capacity to learn; and conditions and teaching practices that enhance motivation to learn. The findings of these studies demonstrate the powerful impact motivation has on student engagement, persistence and learning outcomes.

Studies of different ways of motivating learning show that praise, recognition, rewards and reprimands (often referred to as 'extrinsic' forms of motivation) are all capable of encouraging learning. However, external motivators of these kinds often are less powerful than internal ('intrinsic') motivators of learning such as the desire to learn something because it is interesting, enjoyable or inherently useful, or because it relates to personal long-term goals. Research suggests that intrinsic motivation often is related to the desire to be in control of one's own life, to become more competent or to be connected with or care for others.

In general, learners are more intrinsically motivated if they are pursuing a topic of personal interest, responding to a challenge that they believe is within their capabilities, and feel a sense of autonomy and control over their learning. There is some evidence that, if people are extrinsically rewarded for their performance or for things they would have done anyway, persistence and performance can decline – perhaps in response to a perceived diminution in control.

Closely related to these studies is research into reasons for learning. Researchers have described two broad motivations for learning: 'performance' and 'mastery'. Learners with a performance orientation often are focused on competition, satisfying others, achieving recognition and avoiding negative judgements. Learners with a mastery (or learning) orientation usually are motivated by a desire to develop their competence in an area of learning and to achieve personal learning goals.

These different motivations for learning are reflected in learner behaviours. Learners with a performance orientation tend to focus on learning isolated pieces of information to improve speed of learning and recall. They typically avoid challenging tasks or areas in which they may perform less well than other learners, and may perceive failure as a matter of personal shame. Learners with a mastery/learning orientation tend to enjoy challenging tasks, are more willing to persist and make an effort, and tend to have more positive attitudes to failure.

Other research has studied conceptions of learning ability. Some learners see the ability to learn as 'fixed'. They believe people differ in their ability to learn, meaning that there are better and worse learners. From their point of view, there is little that poor learners can do to change the hand they have been dealt; additional effort may be largely pointless. Others see learning as 'incremental' (also referred to as a 'growth mindset'). They believe that every learner is at some point in their learning and is capable of further progress with effort and appropriate support.

³⁰ eds Bransford et al., *How People Learn*, p. 42.

Learners' views of their own ability to learn have a direct impact on motivation. When learners believe they are capable of success, they are more inclined to make an effort and to persist with their learning, and so are generally more successful. The opposite is true of learners who doubt their ability to learn and have low expectations of success. This can be a particular issue if the learning environment is not seen as welcoming and a place where they belong – for example, if they sense that they are cultural outsiders.

Learning environments can be designed to encourage motivation. One way to do this is to provide learners with a sense of control over their learning, enabling them to pursue personal interests and strengths.

Research suggests that even small meaningful choices can promote a sense of autonomy and control, enhance motivation and lead to improved outcomes. When learners have a degree of control over their own learning, they also are more likely to take on and persist with challenging problems.

Motivation is also enhanced when the learning environment sparks interest and curiosity, and arouses learners' interests to know more. Researchers refer to this as 'situational interest' or interest in specific situations or phenomena. Project-based and problem-based learning can be effective in building situational interest and encouraging perseverance. Motivation is also increased when learners see value and practical relevance in learning, and when it is aligned with their interests and long-term aspirations.

Teachers can promote motivation by connecting with learners' interests and passions; making clear how new learning builds on what learners already know; directing learners' attention; encouraging a focus on learning rather than performance; explaining the meaning and utility of what is being learnt; ensuring that challenges are at a manageable level of difficulty; and providing learners with the ability to monitor the progress they are making and to appreciate the relationship between effort and success.

Educators may support learners' motivation by attending to their engagement, persistence, and performance by:

- helping them to set desired learning goals and appropriately challenging goals for performance
- creating learning experiences that they value
- supporting their sense of control and autonomy
- developing their sense of competency by helping them to recognise, monitor, and strategise about their learning progress
- creating an emotionally supportive and nonthreatening learning environment where learners feel safe and valued.³¹

Progress in learning

A third body of research has explored the developmental nature of learning, addressing questions of how expertise typically unfolds in particular fields, including how new learning builds on prior learning and lays foundations for future learning; common sequences in the development of competence; the impacts of prerequisite knowledge, preconceptions and misconceptions on learning success; and the teaching implications of learners' pre-existing understandings, beliefs and backgrounds.

Underpinning this research is recognition that most human learning does not involve learning discrete, isolated and more or less equivalent facts and skills. Learning is the process through which increasingly interconnected and sophisticated knowledge, skills and understandings in an area of learning are developed over time. The development of expertise involves more than mastering a growing number of facts and skills; it also involves increasingly deep understandings of the principles, ideas and ways of working at the heart of the field.

Research has explored the nature of developing competence in fields as varied as language learning, medical specialisations, classroom teaching, mathematics and history. The general aim of this research has been to describe and understand what it means to be increasingly competent and to elucidate pathways to greater expertise – often to inform teaching programs or professional development.

³¹ National Academies of Sciences, Engineering, and Medicine, *How people learn II: learners, contexts, and cultures*, National Academies Press, Washington, D.C., 2018, p. 133.

Research into learning pathways has included studies of 'learning progressions', defined as descriptions and illustrations of increasing understanding or proficiency in an area of learning. Unlike sequences of proposed learning found in many curriculum frameworks, learning progressions are constructed from empirical evidence about how proficiency typically develops in practice. That is, rather than describing what 'should' occur, learning progressions attempt to describe how learning actually occurs. And because they are evidence-based, these descriptions can be tested and falsified.

Research studies have investigated progressions of developing understanding in areas such as science and mathematics. These studies sometimes have explored learners' increasing understandings of specific concepts such as buoyancy, atomic molecular theory and the flow of organic carbon through socio-ecological systems. The belief is that more explicit, evidence-based descriptions of how learning occurs in practice will provide an improved basis for structuring curricula and deciding appropriate instructional sequences, as well as better frames of reference for establishing where learners are in their learning and monitoring improvements over time.

Other research has highlighted the importance of identifying appropriate starting points for learners' next steps in learning. It is now well established that successful learning depends on connecting with learners' current knowledge, understandings and beliefs. In general, learning is most effective when it builds on, challenges and extends prior learning. Teachers need to be able to establish where students are in their learning, including by diagnosing preconceptions, incomplete understandings and false beliefs. This, in turn, requires a frame of reference against which learning progress can be monitored. Teachers also need to be able to connect with, and build on, the cultural knowledge and starting points of individual learners.

Research suggests that by establishing where learners are in their long-term progress in an area of learning, teachers are better able to provide guidance on appropriately challenging learning goals, provide feedback to inform next steps in learning, and assist learners to see and monitor the progress they make over time.

There is a good deal of evidence that learning is enhanced when teachers pay attention to the knowledge and beliefs that learners bring to a learning task, use this knowledge as a starting point for new instruction, and monitor students' changing conceptions as instruction proceeds... Learner-centred teachers present students with 'just manageable difficulties' – that is, challenging enough to maintain engagement, but not so difficult as to lead to discouragement. They must therefore have an understanding of their students' knowledge, skill levels, and interests.³²

Variability in student attainment

A fourth body of research has explored variability in students' levels of attainment in particular areas of learning and strategies for addressing the varying points learners have reached in their learning. This research has been made possible by advances in educational and psychological measurement and, in particular, by advances that have allowed the construction of measurement scales along which variability in learners' levels of attainment can be mapped and studied.

The use of modern measurement techniques to construct a scale for measuring student attainment is illustrated in Figure 8 which shows distributions of students' levels of attainment in reading based on NAPLAN. Distributions are shown for all Australian Year 3, Year 5, Year 7 and Year 9 students. From these distributions it can be seen that there is significant variability in students' levels of attainment in each year level and significant overlap from one year of school to the next (noting that the distributions for Year 4, Year 6 and Year 8 are not shown here). The best readers in Year 3 are already reading at the level of the average Year 7 student.³² The poorest readers in Year 9 are still reading at the level of the average Year 5 student. As a result, in any year of school, students differ widely in the kinds of texts they can read and the kinds of support they require to improve their reading. The picture is similar for numeracy, except that the variability in numeracy levels does not reduce over time (and there is some international evidence that students' levels of attainment in mathematics become more varied the longer students are in school).

³² Department of Education and Training, *Through growth to achievement*, p. 29.

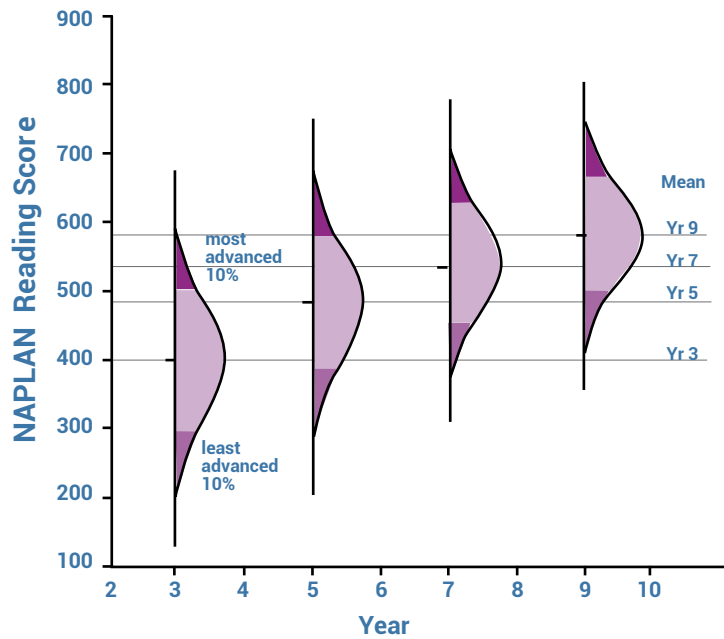


Figure 8 Distributions of student attainment in reading (source: NAPLAN)

Simon et al have studied variability in students' levels of attainment in mathematics.³³ With the assistance of modern measurement theory, they constructed a sequence of eight 'developmental levels' of mathematics attainment from 'relatively naïve beginnings' (Level 1) to 'more sophisticated understandings and capacities' (Level 8). These levels are shown on the left of Figure 9. At each level, the mathematics skills typical of students at that level were described and illustrated, with the researchers noting the possibility of developing teaching and learning materials appropriate to students at each level.

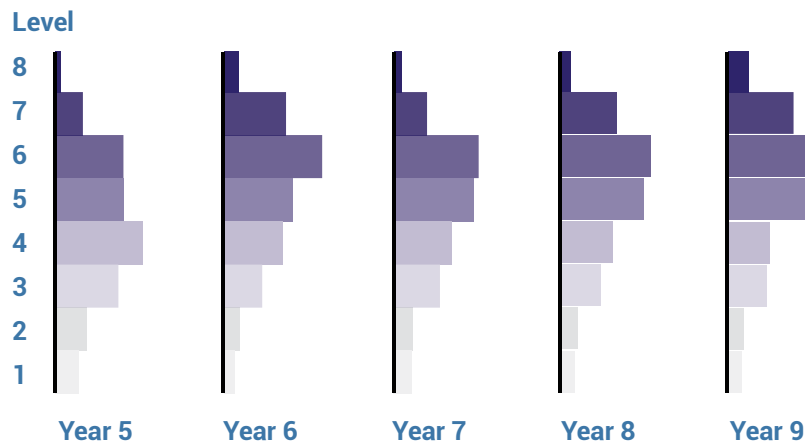


Figure 9 Distributions of student attainment in mathematics (Based on Siemon et al., p. 13)

Figure 9 shows the proportions of students assessed at each level for about 1300 Australian students in each of Years 5 to 9. A striking feature is the spread of students across the eight levels in each year group. The researchers noted that, because Level 1 corresponds in the current curriculum to about Year 2, and Level 8 corresponds to about Year 9, 'the spread within each year level represents a range in students' mathematics achievement equivalent to seven years of schooling'. This example illustrates the importance of recognising that students are at very different points in their long-term progress and of constructing frames of reference for establishing individuals' current levels of attainment, regardless of their age or year group.

³³ D Siemon, A Barkatsas & R Seah (eds), *Researching and using progressions (trajectories) in mathematics education*, Brill, The Netherlands, 2019, p. 13 (figure 1.1).

An essential step in constructing such a frame of reference is to describe and illustrate the nature of long-term development in an area of learning. In most learning areas it is likely to be appropriate to describe and illustrate progress by first describing and illustrating progress in particular aspects of the area. For example, attainment levels in mathematics might be developed by first describing development in particular aspects of mathematics including, but not limited to, algebraic reasoning, geometric reasoning and statistical reasoning.

Day et al have developed descriptions of how algebraic reasoning develops across the middle years of school, although they note that algebraic reasoning also needs to be cultivated in the primary years.³⁴ The researchers refer to these descriptions of development as a 'learning progression' incorporating three big ideas: Equivalence, Pattern and Function, and Generalisation. Their algebraic reasoning progression is designed to 'identify where students are in their learning journey and where they need to go next' and 'to design teaching advice to help teachers provide appropriate activities and challenges to support student learning'.

One of the biggest problems confronting the teaching and learning of algebra is that while the end points or goals of algebraic reasoning may be clear to teachers and textbook writers, not enough is known about how important and sophisticated concepts, such as the three big ideas [Equivalence; Pattern & Function; Generalisation], develop and how they can be supported throughout the primary and junior secondary years. Within the same classroom, some students may have achieved a relatively deep understanding of key algebraic ideas while other students may be operating at a much more basic level. Expressed another way, teachers need to know how to gather reliable evidence to show the level at which students are operating, and what specific teaching is most likely to move everyone's thinking forward.³⁵

Day and her colleagues commenced their research with a review of the research literature to identify a small number of 'big ideas' of algebra. The three big ideas they identified provided the core of their approach to algebraic reasoning. The literature review also revealed that very few attempts to describe the nature of progress in algebra made use of core ideas of this kind.

On the basis of their review of the research literature, the researchers drafted a 'hypothetical learning progression' consisting of eight levels, with the three big ideas represented at each level. Although the focus of the progression was on algebraic reasoning, it was considered important also to identify algebraic content in the progression 'as students, at different levels, need content about which to reason'.

This initial learning progression constructed from the research review provided a basis for developing tasks to explore students' levels of algebraic reasoning. A total of 25 tasks and 75 subtasks were developed, each with its own scoring rubric (usually a 3-point scale) for teacher use in judging the quality of student reasoning. A purpose of the rubrics was to 'show teachers what they need to look for, and how to foster the kinds of classroom discourse and feedback that will move students' reasoning forward'. The tasks were trialled on students in Years 7 to 10, revised and then administered to more than 1500 students across Australia.

The statistical analysis of the resulting data was used to construct a map showing the difficulties of all subtasks as reflected in students' success rates. Although the three big ideas informed task development, because they proved so 'intertwined' in practice, a single map was developed to include all subtasks. This map was used to inform the final learning progression, with the eight levels now being 'based on the evidence of what the students at these levels could actually do'.

The analysis of the data showed that students found algebraic reasoning more challenging than the hypothetical learning progression anticipated. The researchers speculated that algebraic thinking and reasoning are underemphasised in the school curriculum and that 'many students, and possibly some teachers, perceive the focus to be almost exclusively on symbol transformation and manipulation'.

³⁴ L Day, M Horne & M Stephens, 'Reframing mathematical futures II: developing students' algebraic reasoning in the middle years', in D Siemon, T Barkatsas & R Seah (eds), *Researching and Using Progressions (Trajectories) in Mathematics Education*, Brill, The Netherlands, 2019, pp. 126–156.

³⁵ Day et al., 'Reframing Mathematical Futures II', p. 126.

Generalised descriptions of the eight levels of algebraic reasoning were then developed (see Figure 10) and the levels were elaborated for teachers with illustrative learning activities and assessment tasks. Teaching advice also was developed for each level to support teachers to consolidate learning from earlier levels of the progression and to introduce the next level of algebraic reasoning.

Following the study, these researchers made their algebraic reasoning progression, reasoning tasks and scoring rubrics available to all teachers, noting that they 'provide teachers with a window on student thinking about algebra and enable them to know more about their students' understandings, which should enable them to better target their teaching'. They also noted that learning progressions of this kind have implications for curriculum design which 'should be based on what students can actually do and how they usually progress'. And they developed a series of six professional learning modules to support teachers in their development of algebraic reasoning.

Finally, recognising that students in any classroom are likely to be at different levels of attainment, and that teachers need to cater for this diversity, the researchers provided examples of learning activities that could simultaneously be used with students working at a range of levels. These activities can be thought of as low-floor, high-ceiling activities, with each activity being accessible to less advanced students, but also challenging and extending more advanced students.

Implications of variability in student attainment

The observed variability in students' levels of attainment (as illustrated in Figures 8 and 9) tends to be under-recognised in educational policies and practices based on year-level learning expectations. In their research with focus groups of teachers, Joel Rose and Chris Rush of New York's New Classrooms identified an acute tension between 'an underlying policy context rooted in grade-level expectations' and 'an instructional program that is best for each student'. Many teachers in their focus groups described feeling caught between the system's expectation that they would focus only on year-level content and their beliefs about what individual students needed and were ready to learn next. One teacher commented, 'the curriculum we were given says the kids should already know everything up to their grade, and they don't. I was even told a couple of times when I first started that I was teaching below-grade work, and I should be doing on-grade work. But the students weren't ready for that yet.'

Rose and Rush concluded that attempts to portray year-level curriculum standards as 'rigorous' mistakenly assume all students in the same year of school have reached the same point in their learning. Educational policies based on year-level teaching may even be hindering some students' progress: 'Policies push teachers to focus on grade-level material to the exclusion of individual growth, which may be causing some of the most disadvantaged students to fall even further behind. The policies may also be preventing advanced learners from progressing to skills beyond their assigned grade level, even when they have the ability to do so.'

The [year-level] standards alone do not provide guidance to teachers on where to focus instruction. They signal to a seventh-grade teacher, for example, that all seventh-grade students should be taught seventh-grade content—whether they happen to be performing two years behind grade level or two years ahead...

In K–12 education, while the gaze of policy makers is focused on how students are performing relative to grade-level assessments, learning gaps continue to accumulate below the surface, making longer-term success harder to achieve...

We must candidly acknowledge the trade-offs and costs a policy orientation focused on grade-level expectations creates. For far too many students, these costs are substantial given their unfinished learning from prior years...

If policymakers want to create the space for schools to better meet the unique needs of their individual students, they must create new policy frameworks that enable and encourage these practices.³⁶

³⁶ J Rose & C Rush, *The Iceberg Problem: how assessment and accountability policies cause learning gaps in math to persist below the surface...and what to do about it*, New Classrooms, New York, 2019.

Level

- 8 Is able to combine a facility with symbolic representation and an understanding of algebraic concepts to represent and explain mathematical situations. Explanations are sophisticated using logical thought and the language of reasoning. Can use multiple representations in a coordinated manner to solve, analyse, convince and conclude. Can visualise the form and structure of a function, at least graphically, from a real context. Is able to work in a context-free environment using symbolic language and treat algebraic expressions (e.g. $3X+2$) as single entities. Can generalise more complex situations. Is able to establish and describe equivalence involving the four operations explaining relationships in symbolic terms. Can use abstract symbols to solve problems in context with multiple steps.
- 7 Is able to use and interpret algebraic conventions for representing generality and relationships between variables. Beginning to use sound logical reasoning with appropriate reasoning language (e.g. if... then, must) evident. There is more coordination of multiplicative thinking and the associated language to notice algebraic structure. Can recognise and use the relationships between multiple entities and connections between and within different representations. Able to establish and describe equivalence explaining relationships using the distributive property and the inverses of addition and multiplication. Can generalise quite complex situations and in more direct situations beginning to use simplest form.
- 6 Can use and interpret basic algebraic conventions to represent situations involving a variable quantity. Beginning to explain using logical language and to use if... then reasoning. Uses symbolic language but the need for simplification is still being developed. Able to generalise simple arithmetic relationships with justification, including multiplicative relationships, but is often still context bound. Can show why several expressions are equivalent, typically employing numerical (non-symbolic) justifications.
- 5 Able to use multiplicative reasoning in simple situations. Can reason with more complex additive situations involving larger numbers and subtraction but usually by examples. Has moved from algebraic expressions to using equations. Can derive a strategy that maintains equivalence, but cannot yet generalise. Able to use symbols to express rules. Can follow, compare and explain rules for linking successive terms in a sequence. Beginning to generalise using words or using some symbolic generalisations in simple situations. Recognises and represents simple functional representations. Can justify an argument using mathematical text. Beginning to generalise but connects closely to building on in context.
- 4 Beginning to work multiplicatively and simultaneously coordinate variables, although still uses specific examples to convince. Able to reason and generalise in simple situations. Can recognise and interpret relevance of range from table and/or graphs and to recognise functional relationships. When faced with more complex algebraic situations is unable to use the full range of explanation or handle all of the information simultaneously. Beginning to transition to abstraction by inserting a number for a pronumeral.
- 3 Beginning to use symbolic expression and elementary reasoning. While still using arithmetic approaches there is evidence of relational reasoning with the numbers and providing some explanation. Beginning to recognise simple multiplicative relationships but without explanation. There is some evidence of coordination of two ideas but explanation is limited. Algebraic expressions are used rather than equations. Beginning to recognise equivalent relationships. Can explain simple generalisations by telling stories, manipulating materials and very simple use of symbolic language.
- 2 Beginning to recognise patterns and relationships and conjecture about this. Able to identify numbers that vary and numbers that stay the same. Engages with the context, but arithmetic reasoning typically based on calculations is still being used. Recognises some multiples and some relationships like 6 more/6 less, while not necessarily recognising equivalence. Can work with simple scales and transfer from a table of values to a graph.
- 1 Can continue simple patterns, but likely to build them additively. Reasoning is confined to specific incidences and numerical examples of simple physical situations. Arithmetic thinking is used. Abstraction and generalisation not evident at this stage.

Figure 10 Levels of algebraic reasoning³⁷³⁷ Day et al., 'Reframing Mathematical Futures II', p. 142.

Learning environments

A fifth body of research has explored the role of learning environments in successful learning. These studies have highlighted the importance of inclusive, supportive environments in which all learners' backgrounds, strengths and starting points are recognised and welcomed, strong relationships are built, and collaborative learning (including project-based and problem-based learning) is encouraged.

Meaningful engagement and successful learning are strongly influenced by learners' attitudes and expectations. Research clearly demonstrates the importance of learning environments that are welcoming and that provide learners with a sense of belonging and personal meaning, as well as a sense of autonomy and control over their learning. Learning is maximised in environments in which learners believe they are capable of learning successfully, receive supportive and helpful feedback to make decisions about their learning, and are able to monitor and reflect on the progress they are making.

Teachers play a vital role in creating such environments. Research has illuminated how they do this. To be most effective, the environments teachers create and the learning opportunities they provide build connections with learners' backgrounds, starting points and individual learning needs. Teachers promote healthy, productive relationships within the learning environment and motivate learning by stimulating interest and curiosity. They provide appropriate balances of direction, guidance and autonomy. They build learners' confidence in their ability to learn and encourage an ongoing focus on learning and mastery rather than performance. And they provide feedback that guides next steps in learning and assists learners to appreciate and monitor their progress.

Many studies have investigated learning environments as social contexts in which learners and their teachers continually interact. These studies have included research into the role and importance of interpersonal relationships in learning success and the role that culture plays in the learning process. Learners bring a wide variety of background knowledge and starting points to their learning, including varied cultural and linguistic backgrounds. For some learners, mismatches between cultural background and the culture of the learning environment can make the learning environment unfamiliar and unwelcoming, making it more difficult for learners to engage productively in learning. These mismatches can include differences in understandings about rules, behaviours and appropriate uses of language. This research is revealing that cultural considerations are key determinants of learning success and critical factors in all learning.

A number of research studies have considered the role of collaborative/cooperative learning environments and have demonstrated how the quality of collaboration among learners and between learners and teachers influences learning outcomes. Learning often is promoted by focused, cohesive learning communities in which learners work together to support each other's learning. This research has included studies in which learners collaborate on a problem or project that members of a team undertake jointly. Some studies have explored collaboration of this kind in online environments. In 'collaborative learning', there is a need for learners to work together to set goals, make decisions about roles and responsibilities, share tasks, communicate, and address issues as they arise. Some studies have examined the benefits of cooperative learning of this kind in cross-disciplinary problem-solving contexts. Benefits appear to include greater social acceptance of group members, increased task orientation and improved self-esteem.

For some students the culture and practices of school are not markedly different from those they experience outside of school, while for others going to school is a cross-cultural experience that can bring challenges.³⁸

³⁸ National Academies of Sciences, Engineering, and Medicine, *How people learn II*, p. 136..

Metacognition

A sixth body of research has explored the importance of metacognition to learning. This research includes studies of learners' conceptions of, and knowledge about, learning itself; awareness of personal strengths and weaknesses in relation to the demands of tasks and challenges; and 'self-regulation' skills in planning, monitoring, revising and reflecting on learning progress.

Researchers define metacognition as awareness and understanding of one's own thinking and learning processes. This includes a learner's knowledge about themselves – their current levels of attainment, strengths, weaknesses and ways of learning. Learners with higher levels of metacognition have greater control over their learning. They are better able to monitor comprehension of what they are learning, recognise when they do not understand or when there are gaps in their knowledge or skills, identify the need for additional information and proactively seek that information, and recognise inconsistencies between new information and what they already know. Metacognitive skills also enable learners to recognise and reflect on what has worked and not worked in their learning, what does not make sense, and what needs further investigation. In short, higher levels of metacognition provide higher levels of self-awareness and self-monitoring.

Research shows that learners are more likely to learn successfully if they have an understanding of where they are in their learning (their current levels of knowledge, skill and understanding), if they are able to plan ahead and direct their learning to achieve challenging but realistic learning goals, and if they are able to monitor progress in achieving those goals. Metacognition also involves the ability to reflect on and evaluate the success of efforts to improve. Evidence suggests that some of these behaviours are more difficult for younger children, but that learners can be assisted over time to build skills in self-regulation.

Research findings in areas including physics, writing and mathematics indicate that metacognitive strategies are best developed in the context of individual subjects rather than as generic skills taught separately. Attempts to develop metacognitive skills in isolation from subject matter generally have resulted in failure to transfer to specific learning contexts. A general conclusion from research is that the teaching of metacognitive strategies should be a priority in all school subjects.

A 'metacognitive' approach to instruction can help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them.³⁹

³⁹ eds Bransford et al., *How People Learn*, p. 18.

5. GUIDANCE FROM REFORM INITIATIVES

Another source of input and guidance to the Review is international experience in reviewing and reforming school curricula. Most countries routinely review the curriculum to ensure it reflects their current intentions for student learning and contemporary beliefs about best practices in relation to the school curriculum. There also has been growing international interest in what can be learnt from other school systems, especially those that perform at unusually high levels in surveys of student achievement. This section briefly reviews international experience and thinking on some issues raised in public consultations and submissions to the Review.

Flexibility and teacher autonomy

There has been an international trend over the past decade towards greater local decision making in relation to the school curriculum. This trend has given schools and teachers increased autonomy to decide what they teach and when they teach it. The trend has been evident in a range of school systems, including Singapore, Canada's British Columbia, Scotland, China, Japan, Hong Kong and South Korea. In many countries, this trend follows an earlier emphasis on central prescription, standardisation and accountability as system-driven strategies for raising performances in schools.⁴⁰

Fluctuations between specificity/uniformity and flexibility/local decision making have been a feature of school curricula as governments have attempted both to ensure commonality and consistency in curriculum offerings and to free schools to respond effectively to student and community needs. All school systems recognise the importance of ensuring that every student has access to a core of common and essential learning, but in light of evidence that attempts to drive improvement through increased specification and accountability have been largely ineffective, and with growing recognition of the need to develop a broader range of student capabilities and attributes, most systems are now shifting the balance toward flexibility and autonomy.

If the pendulum swings too far towards uniformity, then the curriculum risks becoming too inflexible and difficult to tailor to local needs; whereas if the curriculum swings too far towards diversity, it risks becoming so fragmented that it loses its 'core' and becomes meaningless.⁴¹

There is some international evidence that increased local decision making in relation to the curriculum is associated with higher levels of student performance. A 2013 study by the National Foundation for Educational Research in England identified curriculum flexibility as a feature of high-performing school systems. Although studies of this kind have not established a causal relationship between curriculum flexibility and student performance, flexible curriculum arrangements and greater local autonomy clearly are not impediments to high national performance.

Canada's British Columbia is an example of a system that has recently reduced the level of prescriptiveness in its school curriculum. This was done in response to a review that found strong support for greater flexibility. The revised curriculum is described as 'concept-driven' with a greater focus on core concepts and an emphasis on 'depth over breadth'. The redesigned curriculum shifts responsibility to teachers to decide what to teach and when to teach it, including the amount of time to be allocated to individual subjects. It also provides greater flexibility for students to pursue personal interests. The British Columbia reforms are described as placing 'high confidence and trust in the

⁴⁰ This discussion draws on a paper prepared for the Curriculum Review by Dr Jen Jackson titled 'Balancing prescriptiveness and flexibility in the school curriculum', Australian Council for Educational Research, 2019.

⁴¹ GC Savage, 'A national curriculum in a federal system? Historical tensions in the light of the Australian curriculum', in A Reid & D Price (eds), *The Australian Curriculum: Promises, Problems and Possibilities*, Australian Curriculum Studies Association, Deakin, 2018, pp. 241–252, p. 248.

capacity of its teachers' and are accompanied by a substantial program of professional development to support teachers to adopt greater levels of responsibility and control.

A number of East Asian countries, including China, Singapore, Japan, Hong Kong and South Korea also are in the process of providing greater flexibility in their curricula. These countries have performed at high levels in international surveys of student achievement – a fact often attributed to their high levels of centralised control. However, these countries are now rapidly reforming their curricula to place greater emphasis on creativity and entrepreneurialism and are providing teachers with increased flexibility to do this. For example, Singapore has reduced the content of its school curriculum by up to 20 per cent to allow for 'a wider range of teaching approaches'. The Singapore reforms are described as giving greater respect to teacher autonomy and professionalism, and are accompanied by resources to support less experienced teachers who require them. In China, the school curriculum has historically been prescribed by the central government, with local governments and schools being responsible for implementation. Under recent reforms, the central government now provides an overall vision and framework within which local governments and schools develop more detailed implementation plans, including locally developed courses tailored to student needs.

In the United Kingdom, all school systems have made recent changes to give teachers and students more control over the content, design and pace of student learning. A review of Scotland's 'Curriculum for Excellence' by the Organisation for Economic Cooperation and Development observed that it had 'deliberately moved away from prescription towards a curriculum that has to be built in the different learning settings all over Scotland'. The curriculum is described as abandoning a 'one-size-fits all' national syllabus to encourage schools to develop courses tailored to their students and local circumstances. Similarly, a new curriculum in Wales, being trialled in 2019, has been introduced in response to a finding that the curriculum had become 'unwieldy, overcrowded and atomistic' and was inhibiting teachers' and students' abilities to apply learning to real-life situations and to integrate learning across subject boundaries. According to the Welsh Government, 'teachers will have more freedom to teach in ways they feel will have the best outcomes for their learners'.

Reduced specification of curriculum detail and increased flexibility are considered to deliver a number of benefits. These include the possibility of teaching important material in greater depth because teachers are not required to cover large amounts of prescribed content. Flexible curricula typically provide a broad framework within which teachers and schools work – usually built around core knowledge, concepts and principles in each subject. Greater flexibility also provides opportunities for more student-directed learning, particularly in undertaking projects in areas of interest, addressing real-world problems, engaging in creative and entrepreneurial activities, and building skills in the application of knowledge. With greater flexibility, students have more control over their learning, including by setting goals and monitoring progress in achieving them – factors often associated with higher levels of motivation and student engagement.

From the perspective of teachers, increased flexibility offers improved opportunities to tailor teaching to the backgrounds, interests and attainment levels of students. When syllabuses specify what teachers are to teach to all students, when they are to teach it, and how long they are to spend teaching it, there are often limited opportunities to adapt the content and timing of teaching to students' learning needs. Greater flexibility promotes differentiation and the adjustment of teaching to student backgrounds and local circumstances. It also promotes recognition of teachers as professionals. Professional work involves more than the delivery of 'one-size-fits-all' solutions; it usually involves evaluating presenting circumstances and drawing on professional knowledge to develop personalised interventions and bespoke solutions. The education literature refers to this as 'informed professionalism', with educators applying their professional expertise within broad guiding frameworks. Greater flexibility and trust also have the potential to build teachers' skills in curriculum planning and delivery; to promote greater collaboration and innovation, including with local communities; and to reduce externally imposed compliance requirements.

Structuring the curriculum

Every school curriculum has both content and structure. The content of the curriculum specifies what teachers are to teach and students are to learn, and is reflected in decisions about learning areas, subjects, units/topics and learning outcomes (specific knowledge, skills and understandings). The structure of the curriculum specifies how this content is to be organised, including the sequence in which it is to be introduced.

Historically, the structure of the school curriculum has mirrored the structure of schooling itself. Schooling has been organised into time periods such as phases, stages, school years, semesters and terms, and the curriculum has been structured to align with these periods.

Recent reviews of school curricula have recognised that this traditional structuring of the curriculum is only loosely related to how students actually progress in their learning. One indicator of the mismatch is that, despite students being grouped by age and taught the same curriculum in each year of school, the most advanced students in any year level are at least five to six years ahead of the least advanced students. This raises an important question about the appropriateness of common year-level curriculum expectations for the wide range of student attainment levels in each year of school.

Almost a decade ago, I wrote that 'the greatest challenge facing America's schools today isn't the budget crisis, or standardized testing, or teacher quality. It's the enormous variation in the academic level of students coming into any given classroom.' All these years later, I still believe that's true.⁴²

Added to this, curricula developed for different stages of school often are based on different pedagogical approaches. These differences sometimes reflect different student needs at different ages, but more often reflect historical decisions unrelated to student needs. A consequence is that, rather than providing students with a smooth continuum of learning across the years of school, most curricula present discontinuities and changes of approach that can impact negatively on learning – particularly across arbitrary transition points, including between the years of school.

A consequence of structuring the curriculum to mirror the structure of schooling is that, when students move to the next year of school, they simultaneously move to the next stage of the curriculum – whether they are ready for it or not. This is sometimes referred to as the 'lock-step' nature of schooling, where students are required to progress in the curriculum based on their age rather than on the basis of what they are ready to learn. This can disadvantage students who lack the prerequisites for the next stage of the curriculum and also students who are ready for learning challenges well beyond that stage.

The McComb, Mississippi, school district had a reading problem. Students in the primary grades might be the same age, but their reading levels could be years apart. Giving all the students in the same grade the same instruction was a surefire way to leave some of them far behind. So the district... instead provided instruction based on students' reading level. Students might be in a classroom with their agemates, but because one might be two grade levels ahead, and another might be two grade levels behind, they receive very different instruction. *It's an equity initiative.* The aim is to make sure that all students leave elementary school reading well and ready for the middle school program [emphasis added].⁴³

These issues were addressed in a recent review of the Welsh curriculum.⁴⁴ That review noted that the Welsh curriculum, in common with school curricula around the world, was structured to correspond to chronological 'stages' of school. These stages tended to have distinct philosophies and approaches, resulting in potential discontinuities at transition points. The review noted that 'shifts in philosophy or approach at transition points can hinder progression and there was evidence that this could contribute to disengagement as young people progress through school'. This structure of the Welsh curriculum had other unintended consequences, including 'placing ceilings on expectations or causing teachers to distort teaching to avoid addressing things that may follow in the next stage', resulting in 'a confused context for smooth progression'.

⁴² MJ Pertrilli, *What schools can learn from OrangeTheory about differentiating instruction*, The Thomas B. Fordham Institute, 2019, viewed 25 July 2019, <<http://fordhaminstitute.org/national/commentary/what-schools-can-learn-orangetheory-about-differentiating-instruction>>.

⁴³ Tucker, *Leading high performance school systems: lessons from the world's best*, p. 140.

⁴⁴ G Donaldson, *Successful futures: independent review of curriculum and assessment arrangements in Wales = Dyfodol Llwyddiannus, adolygiad annibynnol o'r cwricwlwm a'r trefniadau asesu yng Nghymru*, 2015, viewed 26 July 2019, <<https://gweddill.gov.wales/docs/dcells/publications/150225-successful-futures-en.pdf>>.

To address these issues, the Welsh review proposed a 'revised approach to progression' based not on automatic age-related curriculum progression, but on recognition that 'children and young people will progress at different rates and that there should be an emphasis on ensuring solid foundations in learning as the best basis for progression'. In particular, the review proposed that the curriculum not be structured to correspond to phases and stages of school, but instead be 'based on a well-grounded, nationally described continuum of learning that flows from when a child enters education through to the end of statutory schooling at 16 and beyond'.

It was proposed that this continuum of learning be divided into a number of 'Progression Steps' which together would 'provide a roadmap for each individual child and young person's progress in learning'. Five progression steps would correspond broadly to expectations at ages 5, 8, 11, 14 and 16, but would recognise that some students 'may move between progression steps more slowly or quickly than others'. In the context of these broad expectations, there would be 'a duty on schools to provide a curriculum that enables most children and young people to reach, or go beyond, each progression step'.

The new [Welsh] national curriculum should be organised as a continuum of learning from 3 to 16 without phases and key stages. Progression should be described in relation to a continuum of learning in each Area of Learning and Experience from when a child enters education to the end of statutory schooling... Progression Steps should be reference points, providing a 'roadmap' for each individual child and young person's progress in their learning and not universal expectations of the performance of all children and young people at fixed points.⁴⁵

Importantly, this proposed structure would be inclusive, 'with all children and young people making progress along the same continuum, regardless of any additional learning needs they may have, although they may move between progression steps more slowly or quickly than others'.

Each progression step would identify and consist of a range of achievement outcomes, including 'embedded' skills such as digital competences, literacy and numeracy. The review considered it 'essential that these are based upon sound understanding of how children progress in different kinds of learning and what they need to know and be able to do in order to move to the next stage securely'.

Progression through the five steps would in general reflect 'a capacity to engage with ideas and issues in greater depth, success in tackling more complex problems and being able to grasp more abstract concepts, and becoming more accomplished in performance'. The review provided further detail of what progression in learning might involve in particular learning areas.

The progression steps proposed by the Welsh review were seen as 'reference points' for schools, teachers, parents and carers to determine whether children and young people make appropriate progress in their learning. The review also noted that, at the national level, the Welsh Government needed to be satisfied that the system as a whole was meeting expectations of both progress and attainment.

In Australia, the 1989 *Committee of Review of New South Wales Schools* (the Carrick Committee) recommended the structuring of the school curriculum 'not so much upon years and hours of study', but to allow students to progress at their own rate and to challenge and extend every student to achieve the highest possible goals. In particular, the Committee encouraged a 'greater emphasis on learning as a continuous individual process'.

⁴⁵ Donaldson, *Successful futures*, p. 56.

The Committee recommends that:

1. Schools and school systems encourage an emphasis upon school structures and patterns of progression which provide sufficient flexibility in, and across, the 'years' of schooling to allow students to progress on the basis of individual capacity, readiness, needs, interests, and degree of achievement in relation to a program of work, provided that due allowance is made for social growth and peer interaction.
2. Teacher education institutions place greater emphasis in their courses upon giving teachers the skills to plan and provide, within appropriate group contexts, the facilitation of individual learning.
3. Syllabuses be structured, not so much upon years and hours of study, but upon the content, skills and attitudes to be learnt and the experiences to be achieved by each student.
4. Student progression through curriculum structures be based upon successful achievement of syllabus objectives and experiences.
5. 'Time' should be regarded in all schooling as a flexible factor in learning rather than as a determining factor.
6. Schools and school systems ensure that all students are challenged and extended to reach the highest possible goals.
7. Schools and school systems encourage structures which are alternatives to the traditional divisions between 'primary' and 'secondary' education such that there can be a greater emphasis upon learning as a continuous individual process.⁴⁶

More recently, the *Review to Achieve Educational Excellence in Australian Schools*⁴⁷ proposed separating the structure of the school curriculum – at least in some key areas of learning – from the structure of schooling itself. That review noted that the current Australian Curriculum specifies a 'diet of knowledge, skill and understanding' for every student in each year of school. However, given the wide variability in student attainment in each year level, 'it is impractical to expect that the same curriculum content can adequately cater to students' different learning needs'. The review noted that some students are not yet ready to be taught the curriculum specified for their year level, while others need to be 'stretched well beyond the year-level standard', and that a curriculum that holds all students to the same expectations 'restricts the ability to maximise the learning growth of every student every year'.

The review recommended the gradual phasing in of 'learning progressions' that would see 'key parts of the curriculum presented as levels of increasing proficiency through which students progress in their school years, independent of year level or age'. This recommendation would 'change the presentation of the curriculum from one organised around year-level packages of content and achievement standards to a structured roadmap of long-term learning progress'. As in the Welsh proposal, a limited number of levels of increasing proficiency would be defined by 'criteria that describe what a child knows, understands and can do' at each level. Students would advance incrementally through these levels by demonstrating mastery of the content of each level. Teachers would establish the level reached by each student at any given time and would tailor their teaching to 'challenge the student to reach the next level'. The review argued that presenting every student with targeted, appropriately challenging learning opportunities in this way was a key to raising the quality of Australian education.

To accelerate individual student learning growth and attainment, we need to shift from presenting the Australian Curriculum as a prescriptive set of yearly targets, and instead use the curriculum as a roadmap of long-term learning progress. Learning progressions that enable teachers to focus on the learning readiness and individual progress of students need to become the new benchmark for monitoring success.⁴⁸

⁴⁶ New South Wales Government Committee of Review of New South Wales, *Report of the Committee of Review of New South Wales Schools: a summary of conclusions and recommendations* (Carrick Report), New South Wales Government, 1989, viewed 26 July 2019, <<http://minerva-access.unimelb.edu.au/handle/11343/191174>>, p. 12.

⁴⁷ Department of Education and Training, *Through growth to achievement*.

⁴⁸ Department of Education and Training, *Through growth to achievement*, p. 27.

Learning progressions

Over the past decade, a large number of studies have explored the development of 'learning progressions' in a range of school subjects, but particularly in science and mathematics. Although definitions of learning progressions vary, there is general agreement that their objective is to describe how students' understandings of, and abilities to apply, core disciplinary concepts, principles and ways of thinking and working grow and become more sophisticated across the years of school.⁴⁹ Importantly, learning progressions are empirically based; they are constructed not only to reflect the logical structure of a discipline, but also to reflect how students' knowledge, skills and understandings typically develop in an area of learning over time.

Learning progressions focus the science education community on how ideas gradually become more sophisticated over time based on coherent unfolding of ideas, instruction, and prior experiences... Learning progressions provide curriculum designers with the tools needed to purposefully build upon students' current understandings in order that they will form richer and more connected ideas over time. Curriculum materials must not only build from the nature of the discipline but also from what is known about how students learn and reason.⁵⁰

International interest in learning progressions has been motivated in part by the observation that curricula in countries that perform unusually well in international surveys such as the Trends in International Mathematics and Science Study (TIMSS) are structured to develop increasingly sophisticated understandings of core disciplinary ideas across the years of school. In these countries, sequencing in mathematics and science curricula 'does not treat topics as interchangeable parts placed arbitrarily on a grade-level grid. Instead, the topics appear to be sequenced to reflect the hierarchical and logical structures of the disciplines'.⁵¹

In the United States, the *Framework for K-12 Science Education* was designed to address concerns that science curricula in that country were overly focused on covering and continually revisiting science topics and content rather than progressively building deeper scientific understandings. The *Framework for K-12 Science Education* incorporates learning progressions based on 13 core science concepts. These progressions 'illustrate how ideas build upon one another to create new levels of understanding'.⁵²

When used in this way, learning progressions provide an underpinning structure for curriculum design. They focus attention on core knowledge, skills and ideas in a subject, and describe how these typically develop over extended periods of time. In so doing, they map potential pathways of learning and provide structures around which less central factual and procedural detail can be sequenced and organised.

General capabilities

Recent international reforms of the school curriculum have placed greater priority on the development of general skills required for life and work.⁵³ Various terms have been used to refer to these skills, including '21st century skills', 'key competencies' and 'general capabilities'. Often these skills have been defined to incorporate 'soft skills', such as personal attributes and values.

The call for increased attention to such skills had its origins in concerns about how well young people were being prepared for the workforce. There was recognition that narrow, vocation-specific knowledge and skills were likely to become increasingly redundant with growing automation, advances

⁴⁹ T Corcoran, F Mosher & A Rogat, *Learning progressions in science: an evidence-based approach to reform*, CPRE Research Report # RR-63, CPRE, Philadelphia PA, 1 May 2009, viewed 24 July 2019, <https://repository.upenn.edu/cpre_researchreports/53>.

⁵⁰ JS Krajcik, 'The importance, cautions and future of learning progression research', in AC Alonzo & AW Gotwals (eds), *Learning Progressions in Science: Current Challenges and Future Directions*, Sense Publishers, Rotterdam, 2012, pp. 27–36, viewed 25 July 2019, <https://doi.org/10.1007/978-94-6091-824-7_3>, pp. 28–29.

⁵¹ WH Schmidt, HC Wang & CC McKnight, 'Curriculum coherence: an examination of US mathematics and science content standards from an international perspective', *Journal of Curriculum Studies*, vol. 37, no. 5, 2005, pp. 525–559, viewed 25 July 2019, <<https://doi.org/10.1080/0022027042000294682>>, p. 555.

⁵² SY Stevens, N Shin & D Peek-Brown, 'Learning progressions as a guide for developing meaningful science learning: a new framework for old ideas', *Educación Química*, vol. 24, no. 4, 2013, pp. 381–390, viewed 25 July 2019, <<https://www.sciencedirect.com/science/article/pii/S0187893X13724911>>.

⁵³ P Weldon, 'Changing priorities? The role of general capabilities in the curriculum', Australian Council for Educational Research, 2019.

in technology and the increasing complexity of modern workplaces. In this context, employers sought general capabilities such as the ability to learn on the job, work in teams, solve problems, and to think critically and creatively about workplace challenges. More recently, there has been a focus on general skills and attributes essential to life in increasingly globalised and multicultural societies confronting complex social, economic and environmental challenges. This has led to capabilities such as global competence, intercultural understanding, social competence and ethical behaviour also being prioritised in the school curriculum.

In Australia, these developments were driven in part by the 1992 Mayer committee which drew attention to the growing importance of initiative, creativity, critical thinking and entrepreneurial skills in workplaces. The Mayer 'key competencies' were proposed as skills to be developed across the school curriculum and also in vocational and higher education institutions. The key competencies identified by the Mayer committee were: collecting, analysing and organising information; using mathematical ideas and techniques; communicating ideas and information; solving problems; planning and organising activities; using technology; and working with others and in teams.

In 2002, the Australian Chamber of Commerce and Industry and the Business Council of Australia coined the term 'employability skills'. The resulting employability skills framework included skills in: communication; teamwork; problem solving; initiative and enterprise; planning and organising; self-management; learning; and technology.

The Australian Curriculum took a broader approach to general capabilities, not limiting them to skills required for work. The 'general capabilities' in the Australian Curriculum are: literacy; numeracy; ICT competence; critical and creative thinking; ethical behaviour; personal and social competence; and intercultural understanding. Teachers are expected to teach and assess these capabilities 'to the extent that they are incorporated within learning area content' and students are expected to develop these capabilities through the application of subject knowledge and skills. The 2018 Gonski review called for increased attention to the teaching, assessment and reporting of these general capabilities.

Strengthen the development of the general capabilities, and raise their status within curriculum delivery, by using learning progressions to support clear and structured approaches to their teaching, assessment, reporting and integration with learning areas.⁵⁴

Most countries now prioritise general skills and capabilities in their school curricula. In 2017, the Brookings Institution reported 117 countries (76 per cent) referring to general capabilities in their curricula, with the most commonly identified skills being creativity, communication, problem solving and critical thinking. There also have been international efforts to promote the assessment and teaching of these skills – for example, through the Assessment and Teaching of 21st Century Skills project – and the Organisation for Economic Cooperation and Development has conducted international surveys of student achievement of skills such as creative problem solving, collaborative problem solving, global competence and creative thinking.

Despite strong international agreement on the importance of prioritising general capabilities in the school curriculum, many questions remain. These include the question of which skills and attributes should be prioritised in schools. A large number of general capabilities have been identified in the international literature and in curriculum reform initiatives. Efforts to identify priorities commonly produce different lists of capabilities and often use different terminology, sometimes implying differences in intention. The Australian Curriculum's general capabilities provide one answer, but do not explicitly list other commonly identified capabilities such as entrepreneurial skills and problem solving. The Gonski review expressed the view that the adequacy of the current list should be considered 'in light of contemporary thinking'. At the same time, schools often identify their own priorities, such as resilience, research skills and mindfulness. A challenge in giving greater priority to general skills and attributes is the wide range of possibilities.

Another question relates to how capabilities are defined. Although much international effort has gone into developing lists and taxonomies of skills and attributes, much less effort has been made to define what is meant by the skills and attributes contained in these lists. Even commonly prioritised capabilities such as creativity (which may be different from creative thinking) are not always well

⁵⁴ Department of Education and Training, *Through growth to achievement*, p. xiii.

conceptualised. Teaching and assessing a capability requires clarity about what higher levels of that capability look like. Some attempts have been made to do this, including through the learning continua developed for the general capabilities in the Australian Curriculum, but these often are based on top-down beliefs rather than being built from theory and/or empirical evidence about how a capability develops in practice. There are exceptions, including work undertaken by the OECD and as part of the Assessment and Teaching of 21st Century Skills project, but in general, the nature of general capabilities and, particularly, the nature of their development tend to be inadequately defined.

There is also a question about how discrete some capabilities are. If they occur as part of complex behaviours, can they be isolated for the purposes of teaching and assessment? For example, can skills in collecting, analysing and organising information be taught and assessed separately or are they best developed and assessed as an integral part of solving a problem or undertaking a project? Is 'personal and social competence' a capability that can be taught and assessed or is it better taught and assessed as several skills/attributes? Questions remain about how broadly or narrowly some capabilities can and should be defined for the purposes of teaching and assessment.

A much-debated question concerns the generalisability of capabilities. The terms 'generic' and 'general' often are used to imply that capabilities – especially skills such as self-management and communication – exist independently of context. Although a capability must have some range of application to be meaningful, how broad is this range? For example, are critical and creative thinking skills generalisable across school subjects in the sense that students who demonstrate higher levels of these skills in one subject tend to demonstrate higher levels of these skills in all subjects? To what extent can these skills be taught and assessed independently of particular subject knowledge? Or are they strictly domain-specific and 'general' only in the sense that they are relevant to a range of learning areas? These questions can be answered only by investigating the range of contexts to which a capability can be generalised. And the answer is unlikely to be the same for all capabilities.

Finally, there are questions about how capabilities are best incorporated into the school curriculum, how they are best taught or developed, and how they are best assessed. Capabilities sometimes are described as an alternative to traditional school subjects as a basis for structuring the curriculum. In other contexts, they are seen as standing alongside and being equivalent in priority to school subjects. The challenge is sometimes described as 'embedding' general capabilities in subjects as appropriate. An unfortunate development has been the emergence of a knowledge-skills tension, with some advocating the prioritisation of general capabilities over subject knowledge, and others rejecting the 'skills movement' in favour of traditional disciplinary knowledge.

The task of working out how to teach general capabilities is often left to teachers. Many school systems have reduced the content of their syllabuses to create space for teachers to give greater attention to general capabilities. Singapore and Japan have reduced their formal curriculum by about 30 per cent. Hong Kong has reduced its formal curriculum to four key learning areas. However, evidence from East Asian and other school systems and from vocational education suggests that teachers see themselves first as subject specialists and often experience difficulty in incorporating general capabilities into their teaching. They require time and professional development to do this.

In some school systems, projects and experiential learning are seen as contexts for the development of general capabilities. In Hong Kong, these include school partnerships with the business sector and other non-education bodies to provide students with practical, real-world experience and problem solving. Singapore has included 'project learning' as a compulsory element of its university entrance examinations. And in Japan and Hong Kong, efforts are being made to blur disciplinary boundaries by presenting students with issues and problems that require the application and integration of knowledge across disciplines.

The assessment of general capabilities presents a particular challenge. It is sometimes argued that general capabilities will not be accorded the priority they require in the school curriculum until they can be assessed and reported with the same rigour and credibility as subject knowledge. In practice, quality assessments of general capabilities are rare. Rubrics developed for general capabilities tend to be open to interpretation and of questionable reliability, and in some school systems are used only as a basis for student self-assessments. In most countries, formal assessment processes continue to be based on disciplinary knowledge or, in vocational education, job-specific skills.

A real assessment of the students' ability to use their knowledge, as in the science of learning, should be the students' ability to apply what they have learned to real-life situations and in collaborative groups. Hence, the ideal assessment should be creative, integrative, practical, and collaborative. This is rare.⁵⁵

Vocational learning

Vocational education re-emerged in Australian secondary schools in the 1990s with vocational learning being integrated into senior secondary subjects and recognised through vocational education and training (VET) qualifications. This coincided with growing student participation rates in senior secondary schools following a decline in youth labour markets, a growing focus on general capabilities required for work and life, and the clearer articulation of industry needs. VET in Schools enrolments trebled between the mid-1990s and mid-2000s in Australia. The desirability of alternative pathways and forms of learning further increased with the raising of the school leaving age to 17 in NSW in 2010.⁵⁶

The introduction of VET in Schools programs was seen as providing a range of benefits to students and schools, including a practical alternative to the traditional academic curriculum; a school learning environment that better catered for the needs of all students; opportunities for part-time work and career exploration; increased retention and student engagement; a pathway to further education and training; dual certification based on the senior school certificate and VET qualifications; and a foundation for entry to apprenticeships, traineeships and post-school VET. A perceived benefit was improved transitions between school and work or further study and opportunities to make progress towards an industry-recognised vocational qualification while also achieving the senior certificate.

Although these benefits have been realised for many students and schools, there are ongoing concerns and challenges in relation to VET in Schools. These include the difficulties of integrating VET programs with their competency-based approaches to teaching and assessment into traditional senior secondary arrangements. This has been addressed through the introduction into some VET courses of external examinations which, while not contributing to VET qualifications, allow students to have their course outcomes count towards the ATAR. Other concerns include the fact that so-called 'entry-level' VET qualifications do not in reality facilitate entry to occupations. Although VET in Schools programs are intended to enhance transitions to work, research shows that they are not currently doing this; it is increasingly difficult to move directly into a meaningful job from a VET in Schools program alone.

There are widely held concerns about the narrowness and low level of many VET in Schools programs. VET subjects often are offered at relatively low levels (Certificate I to III); they are not perceived as being as rigorous as other senior school subjects; they tend to be less valued by students and parents; and employers often do not see them as being sufficiently work integrated or as providing authentic workplace or career exploration. There are concerns that many students currently participate in programs that do not deliver effective pathways into higher education, higher-level VET, apprenticeships, traineeships or skilled work.

A specific concern is that VET in Schools programs often prepare students narrowly for work in particular occupations, rather than providing them with broader exposure to an industry and the kinds of preparation that industry requires. Added to this are concerns about the cost burden on schools, the ongoing challenges of teachers maintaining industry currency, the role that VET in Schools programs play in reinforcing social stratification, and the polarisation of learning in the senior years into 'academic' and 'vocational' learning – with vocational learning usually being seen as of lesser value and appropriate for students of lower ability.

Internationally, vocational learning has been introduced into secondary education by increasing the number and range of available courses, sometimes dramatically. In some countries, including Sweden, Scotland and the United States, this has been done by adding vocational subjects within existing school qualifications. This is also the approach adopted in NSW. Under this approach, vocational learning can be constrained by the dominant curriculum and assessment arrangements that have evolved over time to meet the needs of university-bound students.

⁵⁵ K Cheng, *Advancing 21st Century competencies in East Asian education systems*, Asia Society, 2017, p. 13.

⁵⁶ This section draws on a paper prepared for the Curriculum Review by Dr Justin Brown titled 'Integrating the "academic" and "vocational" in secondary schools', Australian Council for Educational Research, 2019.

In other countries, including England, France, Germany and Japan, stand-alone school-based vocational qualifications have been introduced, often with little or no integration with the general senior secondary curriculum. In some European countries, students are streamed into academic and vocational pathways from an early age, sometimes limiting students' opportunities to move between tracks and restricting subsequent choices and pathways. Although some countries have succeeded in introducing highly regarded separate vocational qualifications, it is not uncommon for such qualifications to be seen as 'second-choice' options.

In Australian secondary schools, vocational education and training (VET) and academic learning are still conceptualised and taught as very separate streams – academic learning focuses on knowledge acquisition in traditional learning areas, and vocational learning through the VET in Schools (VETiS) program focuses on skills acquisition for a particular occupation or trade. This approach to education makes little sense given the range of capabilities that all people will need in the future workforce. There is a broader role for vocational learning in schools to begin cultivating these capabilities – many of which are best developed through applied learning and work-integrated learning.⁵⁷

Broadly Defined Vocational Fields

Competency-based training and assessment have traditionally been based on specific skill sets intended to prepare trainees for specific, often narrowly defined, jobs. This approach has come under growing criticism as giving inadequate attention to the broader capabilities and attributes now required in modern workplaces. More broadly defined learning areas, sometimes referred to as 'occupational fields' or 'vocational streams', have been proposed as more consistent with modern concepts of vocations. In the opinion of Wheelahan et al.⁵⁸, a focus on more broadly defined occupational fields 'would provide a useful framework for structuring programs of study to prepare graduates for a broad range of related occupations in which common practices, and knowledge, skills and attributes are shared'.

According to advocates of vocational curricula based on broadly defined fields, this approach 'starts with the person and not specific skills, tasks or roles and asks about the capabilities that people need to achieve a range of outcomes'⁵⁹. Vocational curricula are envisaged as developing students' capabilities in three domains: the theoretical knowledge needed for the field of practice and for higher level study; the technical skills that transcend particular workplaces; and the attributes the person needs for that occupation or profession, including ethical practice, communication skills, capacity to work autonomously and in teams, and creativity.

Preparation for a vocational stream implies that education will have a broader focus because it is preparation for a number of linked occupations rather than being specific preparation for a specific job. In preparing students for vocational streams, the focus will need to move beyond specific tasks and roles within jobs, to broad fields of practice, where the focus is on the development of the person, the attributes they need and the knowledge and skills they require to work within a broadly defined field of practice.⁶⁰

By organising the curriculum around broad fields of practice, students could be given opportunities to learn more about particular industries, alternative post-school pathways and possible future careers within each broad field. Students who wished to concentrate their study in a particular field could

⁵⁷ M O'Connell & K Torii, 'Vocational learning in schools: an international comparison', in VET: *Securing skills for growth*, Committee for Economic Development of Australia, Melbourne, 2016, pp. 69–82, viewed 25 July 2019, <<https://www.voced.edu.au/content/ngv%3A74069>>, p. 70.

⁵⁸ L Wheelahan, J Buchanan & S Yu, *Linking qualifications and the labour market through capabilities and vocational streams*, National Centre for Vocational Education Research, Adelaide, 2015, viewed 25 July 2019, <<https://www.ncver.edu.au/research-and-statistics/publications/all-publications/linking-qualifications-and-the-labour-market-through-capabilities-and-vocational-streams>>, p. 28.

⁵⁹ J Buchanan, L Wheelahan & S Yu, 'Increasing young people's adaptability and mobility: from competency approach and twenty-first century skills to capabilities and vocational streams', in *Skills and the future of work: strategies for inclusive growth in Asia and the Pacific*, ILO Regional Office for Asia and the Pacific, Bangkok, Thailand, 2018, pp. 125–159, viewed 25 July 2019, <<http://apskills.ilo.org/downloads/chapter-5-increasing-young-peoples-adaptability-and-mobility-from-competency-approach-and-twenty-first-century-skills-to-capabilities-and-vocational-streams-1/view>>, p. 138.

⁶⁰ G Moodie, N Fredman, E Bexley & L Wheelahan, Vocational education's variable links to vocations, Research Report, NCVET, Adelaide, 2013, viewed 25 July 2019, <https://www.ncver.edu.au/_data/assets/file/0024/9339/variable-links-to-vocations-2689.pdf>, p. 31.

be given advice on how to 'package' their senior secondary studies to develop the knowledge, skills and attributes appropriate to that field. This would require the integration of theory and application. For example, 'a student pursuing a pathway to an allied health occupation could embark on a senior secondary program of related academic and vocational subjects in health sciences. Similarly, a student aspiring to a post-school commercial cookery apprenticeship could undertake academic and vocational learning that builds the skills and theoretical knowledge needed for entry to and successful completion of the required employment-based training'.⁶¹

Work can be done to help students understand how traditional secondary school subjects can form a pathway into different broad vocational fields. Clusters of subjects can be identified that can support students to build a coherent study-plan that prepares them for a range of related careers in a field. For example, for a student interested in construction or engineering fields, the relevant pathway would guide them to selecting a range of mathematics subjects along with some vocational technology subjects. This vocational pathway would support them to build knowledge and skills that would be relevant to them, regardless of whether they choose to go on to enrol in a university engineering degree or take up an apprenticeship in carpentry.⁶²

Senior secondary projects

A number of senior secondary qualifications have introduced a major project that students undertake as part of their study in the final years of school. Students usually complete projects on topics of their own choosing. These are in addition to any project work that may be included in individual subject requirements. Major projects, which are designed to promote and recognise skills not developed and assessed in traditional written examinations, sometimes are referred to as 'investigations' or 'research projects'. Examples of several major projects are provided here with brief summaries of their intended purposes and features.

South Australian Research Project

In South Australia, Year 12 students are required to undertake a Research Project and must achieve a grade of C– or better on the project to gain the South Australian Certificate of Education (SACE). The Research Project represents about ten per cent of a student's work for the year and is described as an opportunity for students to develop and demonstrate skills that will prepare them for further education, training and work. The Research Project is designed to develop and recognise skills in planning, research, synthesis, evaluation, and project management. Students choose a research topic in an area of interest and are expected, through the project, to develop abilities in questioning sources of information, making effective decisions, evaluating progress, being innovative and solving problems.

In undertaking the Research Project, students are expected to:

- generate ideas to plan and develop a research project;
- understand and develop one or more capabilities in the context of their research;
- analyse information and explore ideas to develop their research;
- develop specific knowledge and skills;
- produce and substantiate a Research Outcome; and
- evaluate their research.

These expectations include identifying one or more of the seven Australian Curriculum general capabilities and exploring that capability, or those capabilities, and its/their development in the context of their research.

Students use a 'research framework' consisting of four parts as a guide to developing their research:

1. initiating and planning the research;
2. developing the research;

⁶¹ K Clarke, *Entry to the vocations: strengthening VET in schools*, Research Report, NCVET, 2013, viewed 26 July 2019, <https://www.ncver.edu.au/_data/assets/file/0015/8052/entry-to-vocations-2678.pdf>, p. 23.

⁶² S Joyce, *Strengthening skills: expert review of Australia's Vocational Education and Training system*, Commonwealth of Australia, Department of the Prime Minister and Cabinet, Canberra, 2019, viewed 25 July 2019, <<https://www.pmc.gov.au/resource-centre/domestic-policy/vet-review/strengthening-skills-expert-review-australias-vocational-education-and-training-system>>, p. 96.

3. producing and substantiating the Research Outcomes; and
4. evaluating the research.

Assessments are based on a Folio in which the student records their planning and development of the research (school assessed and worth 30 per cent); a Research Outcome that resolves the research question and presents the findings (school assessed and worth 40 per cent); and an Evaluation in which students evaluate and reflect on the research results (externally assessed and worth 30 per cent).

Assessments are made against four criteria – planning, development, synthesis, evaluation – with five described levels of performance on each criterion, labelled A to E. Schools submit a sample of student work representing each grade between A+ and E– to a moderator for confirmation or adjustment.

Victorian Extended Investigation

In Victoria, students are able to undertake an Extended Investigation as part of the Victorian Certificate of Education. The Extended Investigation is designed to enable students to 'develop, refine and extend knowledge and skills in independent research'. Students can complete the investigation as an extension of other study they are undertaking or independently of their program of study.

The Extended Investigation enables students to:

- develop and construct a rigorous research question;
- understand and apply research methods;
- explore a chosen area of investigation in depth;
- develop as independent, critical and reflective learners;
- develop research project management knowledge and skills;
- analyse and evaluate findings and results; and
- develop skills in written and oral presentation of research findings.

The investigation is conducted as part of a two-unit sequence at a standard equivalent to the final year of secondary school. Each unit involves at least 50 hours of scheduled, supervised instruction, as well as out of school time to undertake research that schools are required to monitor.

In the first unit, Designing an Extended Investigation, students devise a research question, set the parameters for their research, examine a range of research methods, conduct a literature review, and explore the purpose and ethics of undertaking research. They also develop a research plan, learn to apply the conventions of academic report writing, and make an oral presentation on the background and significance of their research question and the details of their research plan. Students develop skills in critical thinking, including constructing and deconstructing arguments, recognising the influence of cognitive biases, and critiquing propositions and arguments.

In the second unit, Presenting an Extended Investigation, students complete their investigation and write a final research report that presents and evaluates the conclusions of their investigation. Students are expected to demonstrate skills in research project management; data analysis; organising, synthesising and evaluating research findings; using conventions of academic writing and report structures; and using relevant research concepts and terms. They are required to explain their investigation, critically evaluate their research process, and defend research findings in a presentation to an educated non-specialist audience.

A mandatory component of the investigation is the maintenance of an Extended Investigation Journal. This is a formal record of a student's investigation, maintained throughout the project, which provides supervising teachers with documentation to authenticate student work and students with a mechanism to track, review and refine the focus of their investigation.

Student performance in the first unit is assessed through a school-assessed component (design and justification of research question; research plan; and oral presentation) and an external Critical Thinking Test. Performance in the second unit is assessed through a two-part externally assessed task: a final written report and an oral presentation incorporating defence before an external panel.

International Baccalaureate Extended Essay

The International Baccalaureate Diploma Programme includes a mandatory independent, self-directed piece of research culminating in a 4000-word paper. The Extended Essay is designed to provide students with an opportunity to investigate a topic of special interest to them and related to one of their six Diploma Programme subjects. It is also seen as practical preparation for undergraduate research.

The Extended Essay is designed to develop students' abilities to 'analyse, synthesise and evaluate knowledge'. Students are expected to develop skills in:

- formulating an appropriate research question;
- engaging in a personal exploration of the topic;
- communicating ideas; and
- developing an argument.

Throughout the process of researching and writing their Extended Essay, students are supported by advice and guidance from a supervisor – usually a teacher at their school. Students must meet with their supervisor three times in 'reflection sessions', with the third session being referred to as *viva voce*.

Performances on the Extended Essay are externally assessed by examiners appointed by the International Baccalaureate. The resulting scores (0 to 34) are reported as a grade from A (excellent) to E (elementary).

International Mathematical Modelling Challenge

Although not part of a senior secondary qualification, another instructive example of a senior years' project is the International Mathematical Modelling Challenge.⁶³ The aim of the Challenge is to provide students with opportunities to explore the application of mathematics in real situations to solve important problems. The Challenge is designed to develop and enhance students' abilities to visualise, understand and apply mathematics in real-world contexts.

In undertaking a mathematical modelling project, students are expected to 'develop a systematic and successful approach to addressing individual problems located in real-world settings' and to progressively become more able to address problems set by others and to identify and address problems themselves.

The mathematical modelling project expects students to:

- Describe the real-world problem. Identify and understand the practical aspects of the situation.
- Specify the mathematical problem. Frame the real-world scenario as an appropriate, related mathematical question(s).
- Formulate the mathematical model. Make simplifying assumptions, choose variables, estimate magnitudes of inputs, justify decisions made.
- Solve the mathematics.
- Interpret the solution. Consider mathematical results in terms of their real-world meanings.
- Evaluate the model. Make a judgement as to the adequacy of the solution to the original question(s). Modify the model as necessary and repeat the cycle until an adequate solution has been found.
- Report on success or document how further research could make adjustments and try for a better solution. Communicate clearly and fully suggestions to address the real-world problem.

Students work in teams to address provided mathematical challenges. Past challenges have included the development of mathematical models for scheduling the filming of movies; purchasing insurance for athletics events; choosing locations for international meetings; and choosing the best hospital.

Projects are assessed on:

- Problem definition (specification of precise mathematical questions for the general problem statement).
- Model formulation (identification of assumptions with justification; choice of variables; identification and gathering of relevant data; choice and justification of parameter values; development of mathematical representations).
- Mathematical processing (application of relevant mathematics; use of appropriate technology; checking of mathematical outcomes; interpretation of outcomes).
- Model evaluation (adequacy and relevance of findings; elaboration or refinement of problem; relevance of revised solutions; quality of answers).
- Report quality (succinctness; power to attract reader; overall organisation; logical presentation).

Major projects of these kinds provide students with opportunities to develop and demonstrate skills in applying subject knowledge to the investigation of meaningful real-world questions, problems and

⁶³ P Galbraith & D Holton, *Mathematical modelling: a guidebook for teachers and teams*, Australian Council for Educational Research, Camberwell Australia, 2018, viewed 26 July 2019, <<https://www.immchallenge.org.au/files/IM2C-Teacher-and-student-guide-to-mathematical-modelling.pdf>>.

challenges. These skills are becoming increasingly important in workplaces and are crucial to most post-school learning, but are not adequately addressed by traditional written examinations. The introduction of major projects as components of senior secondary study is providing the education community with valuable practical insights into issues such as the authentication of student work and the assessment of individual and team contributions.

Proficiency standards

The US National Center on Education and the Economy (NCEE) has spent three decades researching the policies and practices of the world's highest performing school systems as measured by international surveys such as the OECD's Programme for International Student Assessment (PISA) and the IEA's Trends in International Mathematics and Science Study (TIMSS). The aim has been to understand the features of these high-performing systems and the educational principles that underpin those features.⁶⁴

One conclusion of this research is that an important feature of high-performing systems is their expectation that every student will study a common, core curriculum – usually from the beginning of school until about Year 10 – and will achieve a specified standard of attainment on that curriculum. NCEE's Marc Tucker refers to this specified standard of attainment as a 'gateway' standard that requires students to 'demonstrate a specified level of knowledge and skills' representing satisfactory completion of the common, core curriculum and providing the foundations necessary for more advanced study. In the typical top-performing country, these standards are accompanied by examples of student work that meet the standard.

Once students demonstrate this standard, they are able to choose from a range of advanced courses of study 'depending in part on what they want to do and in part on how well they have done up to that point'. For students who require it, more time and support are provided to achieve the gateway standard. For example, Singapore 'makes sure that the least accomplished students have the time and support they need to reach the standard, no matter what it takes... For the students at the very bottom of the distribution, the time allotted to the core is extended, all the way to the end of high school, if necessary'. For advanced students who meet the standard, there is the possibility of studying enriched curricula and 'moving on to get more advanced qualifications earlier'.

[In Singapore] the whole system is set up so that all but the most severely handicapped students are expected to meet a high, internationally benchmarked standard of academic achievement, including students who choose the vocational path.⁶⁵

As well as setting standards in relation to the common, core curriculum, it is usual in high-performing countries to set standards for satisfactory completion of secondary education. And in many countries, the achievement of these standards is demonstrated through performances on external examinations.

There is growing recognition among high-performing countries that an urgent challenge is to provide every student with the levels of knowledge and skill that once were achieved by only some students. As Tucker notes, low levels of school achievement are increasingly unacceptable because 'much of the unskilled and semi-skilled work that used to be available to people leaving school with only basic skills will be done more reliably and cheaply by digital devices of all kinds'.

Currently, most countries 'sort' students on the basis of their school performance. The key to sorting is to hold time constant and to sort students on how much they learn in a fixed period of time. However, sorting systems are incapable of providing every student with the levels of knowledge and skill they now require. An alternative is to hold every student to the same high proficiency standard and to recognise that individuals will require different kinds and amounts of support (depending on the stages they have reached in their learning and the difficulties they are experiencing) and different lengths of time to reach that standard. This is the alternative that many high-performing countries are now implementing. 'It is designed not for sorting students into different futures, but for enabling all students to achieve high standards.'⁶⁶

⁶⁴ This section draws on Dr Marc Tucker's 2019 book *Leading high performance school systems: lessons from the world's best*.

⁶⁵ Tucker, *Leading high performance school systems: lessons from the world's best*, pp. 73–74.

⁶⁶ Tucker, *Leading high performance school systems: lessons from the world's best*, p. 104.

If the aim is to get everyone to a high standard, then the standard must be high and constant, and the time taken to reach it variable, which is the exact opposite of the system we now have, in which time is held constant and the standard achieved varies with the student. We cannot sort our way to greatness.⁶⁷

Tucker's advice to system leaders in the United States is to establish a new proficiency standard 'as the standard you want a steadily rising proportion of your students to reach by the end of 10th grade and all but the students with the most significant delays to reach by the time they leave high school'.

However, as Tucker points out, the specification of proficiency standards is only one element of the learning systems established in high-performing countries. Standards are accompanied by a curriculum framework that 'reflects both the logic of the subject and the normal developmental trajectory of students who study that subject'. It is 'carefully matched to what the research tells us about the way students actually learn the material'. And tightly aligned with this framework are syllabuses that specify in more detail what is to be learnt; accompanying teaching materials and methods; and assessments of student learning. No less important in high-performing countries are 'the strategies used to keep all students on track'. Teachers are expected to 'closely monitor their students' progress... and to add time and other resources if they start to fall behind'.

Based on research into the use of proficiency standards and aligned curriculum frameworks in high-performing countries, a number of American states are introducing their own 'college and career ready' standards. The Arizona state legislature has offered schools the opportunity to issue a Diploma to students who demonstrate the attainment of a specified level of knowledge and skills. Students who meet this standard before the end of Year 12 are able to commence advanced coursework, including through dual enrolment in a post-school institution. The Maryland Commission on Innovation and Excellence in Education has proposed a new high school graduation system based on the achievement of a 'college and career ready' standard. Students would be able to demonstrate this standard at varying times during their schooling and until the age of 21.

Standards of this kind shift the focus of teaching and learning from time served to standards achieved. They make explicit that it is not sufficient for every student to be exposed to a common, core curriculum. As a result of studying a subject – usually for most of their schooling – every student should be expected to achieve, at a minimum, a specified level of knowledge and skill in that subject. School systems based on this expectation recognise that individuals have differing learning needs and require varying kinds of support and lengths of time to achieve high standards. Rather than demanding that all students progress in a lockstep fashion through the curriculum, and then using the outcomes of this process to sort students by their performance, high-performing countries recognise that when students meet a proficiency standard is less important than the fact that every student eventually meets it.

⁶⁷ Tucker, *Leading high performance school systems: lessons from the world's best*, pp. 71–72.

6. DESIGN PRINCIPLES

Any major change to the school curriculum must be guided by a clear set of design principles. These principles provide the theoretical foundations and rationale for change. They indicate desirable directions of change and play a role in guiding any redesign process.

Input to the Curriculum Review – including through public consultations, targeted focus groups, written submissions, reviews of research and international curriculum reform experiences – has suggested a number of principles relevant to any future redesign of the NSW curriculum. These principles are outlined here.

Learning with understanding

Essential to school learning is the development of increasingly deep understandings of core concepts and principles in an area of learning, around which factual and procedural knowledge is organised.

This principle sees learning with understanding as a central goal of every school subject. As students make progress in a subject, they not only acquire more sophisticated knowledge and higher levels of skill, they also develop deeper understandings of the concepts and principles at the heart of the subject. These concepts and principles enable students to structure and make sense of the material they are learning and are a crucial aspect of increasing competence.

Learning for understanding can be contrasted with the superficial memorisation of facts and procedures. Although no curriculum intends to promote superficial learning, this can be the outcome when curricula specify large amounts of material to be learnt, focus on the performance of specific tasks or are based on checklists of outcomes or skills. When a curriculum attempts broad 'coverage' of a subject, there is often pressure to address many topics in a short space of time, resulting in an emphasis on memorisation and the learning of disconnected information. Such curricula are sometimes referred to as 'mile wide and inch deep'. Learning for understanding is further compromised when assessment processes prioritise the testing of facts and skills over assessments of thinking and understanding.

Learning based only on following specified routines, reproducing provided information and/or performing low-level tasks is particularly detrimental if it limits opportunities and quality of learning for particular groups of students. Learning with understanding must be an objective for every student if they are to be well prepared for life and work in an increasingly knowledge-based society.

Research studies provide insights into conditions that promote learning with understanding. These conditions include a deliberate intention in curricula to develop depth rather than breadth of learning. The development of deep understanding usually requires a decision not to attempt comprehensive coverage of many topics, but to teach a smaller number of topics in depth. This means focusing effort on what is central to a subject – core knowledge and understandings that develop over extended periods of time and that characterise experts in the field.

The development of deep knowledge and understanding is more difficult than superficial factual and procedural learning. It also cannot be rushed; it requires substantial time. Students must have opportunities to engage with multiple examples of the application of a concept or principle in a range of contexts. In this way they learn to transfer what they have learnt to new situations. Through in-depth studies of applications, students come to understand the conditions to which knowledge, concepts and principles can be applied and develop an ability to recognise similarities, differences and meaningful patterns in information.

Learning with understanding also requires teachers who are able to promote students' deep understandings of subject matter. Teachers must know what higher and lower levels of conceptual understanding look like in a subject and how these are reflected in students' thinking and work. They

must be able to provide a range of application contexts that challenge and build student understanding. And they must be skilled in identifying and monitoring improvements in thinking and conceptual understanding.

The implications of this principle for curriculum design are that the school curriculum should prioritise the progressive development of students' understandings of a relatively small number of fundamental concepts and principles that are central to the subject and around which important knowledge and skills can be organised. Increasing depth of understanding should be prioritised over the superficial coverage of a comprehensive range of topics and factual and procedural knowledge. The progressive development of deep understanding is a long-term agenda that requires time and opportunities to revisit concepts and principles in increasing depth and varying contexts across the school years. Assessment processes must reinforce this priority by focusing not only on the recall and reproduction of facts and procedures, but also on the quality of student thinking and understanding. And teachers are likely to benefit from resources and professional learning to support such teaching and assessment.

Skills in applying knowledge

By incorporating both theory and application, school subjects develop students' appreciation of practical relevance, as well as their skills in applying knowledge to real-world contexts and problems.

Motivation and engagement in learning generally are higher when the material being learnt is meaningful to the learner and when its potential use and relevance are clear. Many students complain that they are unable to see how what they are learning has any personal relevance or why they should be learning it, beyond the fact that they will be assessed on it. For this reason alone, it is important that the curriculum provides time and opportunities for teachers to explain, and students to explore, the relevance and practical application of curriculum content.

Real-world applications and hands-on experience also are capable of providing students with deeper understandings of facts, processes, concepts and principles. Opportunities to apply learning in a range of contexts and to a variety of challenges not only increase interest and engagement, but also can give practical meaning to otherwise abstract concepts. Research suggests that, when students engage with applications of what they are learning, they also are more likely to remember what they learn.

Beyond this, if students are to be informed citizens capable of making decisions in their own best interests and the best interests of society, then they must understand the relevance of, and be able to apply, what they have learnt to real-world issues. Abstract learning that cannot be related to lived experience will be of little assistance to students in thinking about and making sense of experience. The ability to apply what is learnt, rather than simply reproduce it, is captured in the concept of 'literacy'. For example, the Organisation for Economic Cooperation and Development (OECD) defines reading literacy, mathematical literacy and scientific literacy not simply as abilities to recall and demonstrate facts and procedures, but as abilities to apply knowledge to engage with real-world issues. Literacy is the ability to put knowledge to work.

Scientific literacy is the ability to engage with science-related issues, and with the ideas of science, as a reflective citizen. A scientifically literate person is willing to engage in reasoned discourse about science and technology, which requires the competencies to recognise, offer and evaluate explanations for a range of natural and technological phenomena; describe and appraise scientific investigations and propose ways of addressing questions scientifically; and analyse and evaluate data, claims and arguments in a variety of representations and draw appropriate scientific conclusions.⁶⁸

For all the above reasons, every school subject should provide a mix of theory and application, with opportunities for students both to acquire new knowledge and understandings and to apply their new learning to practical, real-world issues and experiences. And, through these practical applications, students should be expected to build deeper knowledge and understanding.

⁶⁸ OECD, PISA 2015 Assessment and Analytical Framework – Science, Reading, Mathematic, Financial Literacy and Collaborative Problem Solving, OECD Publishing, Paris, 2017, viewed 26 July 2019, <<https://www.oecd.org/publications/pisa-2015-assessment-and-analytical-framework-9789264281820-en.htm>>, p. 22.

Providing students with opportunities to apply what they are learning also provides contexts in which to build skills of application. These skills include asking and refining questions; designing and conducting investigations; gathering, analysing and interpreting information or data; collaborating and communicating with others; drawing conclusions and reporting findings; setting goals, planning, monitoring, evaluating and reflecting on what has been learnt; critical and creative thinking; and managing self and time.

Skills in applying knowledge often can be built by providing students with engaging, open-ended problems to solve or projects to complete. When problems and projects are open-ended, they allow students at different levels of attainment to engage in the same challenge in different ways. The objective is to provide all students with opportunities to apply – and often extend – their learning by working with others to achieve a shared goal. Although projects and problems (for example, in medical education) sometimes are treated as contexts in which to introduce factual and procedural knowledge, more commonly they are part of a 'two-phase' approach in which students are first introduced to knowledge and skills and then apply them in a range of real-world contexts.

Research studies suggest that providing students with opportunities to apply their knowledge in these ways results in higher levels of intrinsic motivation linked to greater levels of student choice; improved student attitudes and engagement; deeper levels of content knowledge and conceptual understanding; and improved knowledge about uses of technologies.

The implications of this principle for curriculum design are that the school curriculum should provide opportunities for students to apply their knowledge, skills and understandings to meaningful, real-world questions and challenges over an extended period of time and drawing on learning from different subject areas as required. These opportunities should be designed as contexts in which students are able to develop and demonstrate a range of skills in applying and building knowledge.

High expectations

Every student should make excellent ongoing progress in their learning and all should reach high standards in key areas of learning by the time they leave school.

This principle is based on the belief that high expectations should be set for every student's learning. The principle has two components: first, every student should be expected to make excellent ongoing progress in their learning, where 'excellent' progress may be differently defined for different students; and second, every student should be expected to achieve high standards in a small number of specified learning areas by the time they complete their schooling.

The expectation that every student should make excellent ongoing progress recognises that, for some students – especially those with disabilities and learning difficulties – progress may occur in smaller increments and at slower rates. Some of these students also may experience setbacks. As a result, excellent progress for some students may be different from the higher rates of progress expected of others.

For the great majority of students, the expectation should be that they will make steady, strong progress in their learning across the years of school. This high expectation for learning is sometimes described as 'a year's progress for a year of school'; however, the specification of expected progress in a year of school can be problematic. A reasonable expectation for some students may be less reasonable for others. For example, children in the early years of school who begin the year with very limited reading skills usually make significantly greater progress in their reading than children who begin the year with high levels of reading skill. This is simply because they are beginning from a lower base (or steeper section of the reading growth curve). For these students, greater reading progress should be expected over the ensuing school year. Nevertheless, in a general sense, every student should be expected to make excellent personal progress in their learning every year.

The second aspect of this principle expects every student to achieve high standards in specified areas of learning by the time they complete thirteen years of school. These areas of learning might include (but not necessarily be limited to) English, Mathematics, Science and Human Society and its Environment. In each identified area of learning, students should be expected to reach a high standard of knowledge, understanding and skill that both prepares them for life beyond school and provides a base for students choosing to undertake more advanced study in the area in the senior years of school. This expectation represents every student's 'common entitlement'. As a result of attending school, every student should be exposed to, and have opportunities to learn, a common core of curriculum content and all should be expected to achieve at least minimum (but high) standards in those core areas during their school years.

The high expectations defined by this principle (excellent year-on-year progress and the achievement of high standards by the completion of school) are different from other commonly defined expectations. For example, 'high expectations' often are defined in terms of performance standards that all students in each year of school are expected to meet. A limitation of such standards is that they often represent inappropriately low expectations for some students, but inappropriately high expectations for others. Although setting the same performance expectation of every student often appears 'equitable' and a way of improving overall levels of performance, widely varying levels of attainment in each year of school mean that no single standard can represent an appropriate level of challenge for every student.

The implications of this principle are that the school curriculum, through its design, should support teachers to: establish where individual students are in their learning at any given time; provide every student with appropriately challenging learning opportunities; monitor the progress individuals make in their learning over extended periods of time; and evaluate whether students are on track to achieve expected high standards in identified learning areas by the completion of school.

An inclusive curriculum

Within each school subject, the same curriculum should apply to all students, recognising that individual learners are at different points in their learning and require different levels and kinds of support.

An inclusive curriculum is accessible to all students. In particular, it does not limit some students' access to learning on the basis of cultural or language background, disability, learning difficulties or current level of attainment. An inclusive curriculum is designed to minimise the likelihood of some students being locked into narrow courses, low expectations or restricted pathways to high achievement.

This general principle is sometimes referred to as the principle of 'universal design' and was introduced by architects to describe services and environments accessible to the widest possible range of users without the need for specialised designs or modifications to meet the needs of specific groups. Universal design aims to provide equality of access and to avoid segregating or stigmatising some users.

Applied to the school curriculum, universal design involves developing curricula that are accessible to the widest possible range of student backgrounds and achievements and avoiding the design of separate curricula for specific groups. It recognises that individuals will engage with the common curriculum differently (for example, because of their different levels of progress) and will require different learning opportunities and support to do this. But these are seen as implications for pedagogy, not curriculum design.

Inclusive curriculum design depends on an understanding of the different backgrounds and starting points students bring to their learning and of the ways in which curricula can deny or limit full access for some students. For example, a curriculum can be less accessible if it is based on assumptions about cultural and linguistic starting points that do not apply to some students. An inclusive curriculum not only will avoid barriers of these kinds, but also will facilitate access by attempting to build connections to student backgrounds to encourage a sense of belonging within the curriculum. This is important for Aboriginal and Torres Strait Islander students, but it also is important for students from a range of cultural backgrounds.

Decisions to design separate curricula for particular student groups are made with good intentions, but often have unintended and unanticipated consequences such as categorising and labelling students, setting low expectations, and placing ceilings on how far individuals can progress in their learning. For example, separate curricula for students with disabilities or learning difficulties can result in lowered expectations and restrict access to higher levels of learning and attainment. An alternative to separate curricula is to view the same curriculum as appropriate to all students, but to recognise that some students are at earlier stages in their learning and so require challenges and opportunities appropriate to those earlier stages. Rather than designing a separate curriculum, work may be required to better understand typical student needs and the nature of progress in these earlier stages of learning.

The same observation can be made of curricula that provide parallel 'streams' within the same school subject, often intended for students with different levels of ability. For example, students sometimes are given a choice between a lower-level (possibly 'applied') mathematics course and a higher-level course. This can result in students attempting to decide whether a higher performance on an easier course would be preferable to a lower performance on a harder course. In addition, lower-level courses usually deny students access to higher levels of attainment. An alternative is a common, inclusive curriculum designed around a view of learning as long-term progress and recognition that every student is at

some point in that progress. Inclusive curriculum design means ensuring that teachers are supported to establish where students are in relation to this common progression of learning and to provide curriculum content at an appropriately challenging level.

There are various other ways in which the design of the school curriculum can limit some students' access to quality learning. These include the construction of narrow courses that limit access to a broad, general education. Such courses often are designed primarily to provide knowledge for post-school study or skills for specific occupations. Rather than limiting some students' learning in these ways, an inclusive curriculum provides every student with a breadth of knowledge, understandings, skills and attributes as preparation for further study, life and work.

The implications of this principle for curriculum design are that, within each school subject, the curriculum should be designed as far as possible to be inclusive of, and accessible to, every student. This requires a design based on recognition that every student is at some point in their learning and is capable of further progress if provided with learning opportunities appropriate to their backgrounds, starting points and current levels of attainment. In general, separate curricula designed for specific groups of students (with the exception of courses that enable students to specialise in particular aspects of a subject) are not consistent with the universal design principle or the intentions of an inclusive curriculum.

Emotional engagement

Curiosity, discovery, wonder and passion should be motivators and features of learning for every student throughout their school years.

Students' attitudes to school and their emotional engagement in learning are key determinants of learning success. Depending on its design, the school curriculum can either promote or undermine students' levels of emotional engagement.

From a very young age, children display curiosity, an enthusiasm for exploration and discovery, and joy in learning about the world around them. Learning comes easily and is largely intrinsically motivated as children explore what interests them. Once children are in school – and often the longer they are in school – learning tends to be motivated not by curiosity and wonder, but by other influences, including the desire to please others. Personal investment and emotional engagement become increasingly externally motivated rather than arising from personal interests, curiosities and passions. By the secondary years, there is little joy in learning for many students, and by the completion of secondary school, joy often has been replaced by the stresses of externally motivated learning and competition with others.

A consequence of this common student experience is increasing disenchantment and disengagement, particularly through the middle years of school. Teachers sometimes describe two categories of students: those who learn to play the 'game' of school, however joyless it may be at times; and those who fail to see the relevance of what they are being asked to learn and disengage. For the latter group, negative attitudes often are exacerbated by continual reminders that they are performing below expectation. Large numbers of students currently develop negative attitudes to school and disconnect from the learning it requires – either by withdrawing emotionally or by their growing non-attendance. The school curriculum and its design inevitably influence these attitudes.

There is no inherent reason why curiosity, discovery, wonder and passion should not be motivators and features of learning for every student throughout their school years and beyond. This is not to say that students should be free to learn whatever they wish whenever they choose, but that learning should provide opportunities for every student to learn in ways that are intellectually stimulating and that allow them to explore the meaning and relevance of what they are learning. This includes opportunities to develop deeper insights, make new connections, solve meaningful problems and create new solutions. In other words, intrinsically motivated, curiosity-driven learning should be an aspiration for the entire school curriculum.

Teachers are in powerful positions to build students' emotional engagement and positive attitudes to learning, but they normally work within the constraints of mandated syllabuses. Ideally, teachers create classroom environments in which students feel supported to take risks in their learning, are not afraid to make mistakes, are recognised for the efforts and personal progress they make, and receive feedback that is encouraging, positive and helpful in guiding next steps in learning. Such teachers believe every student is capable of making progress in their learning with effort and appropriate support (commonly referred to as a 'growth mindset'), and they recognise and celebrate excellent progress when they see it.

The school curriculum, through its design, can enable teaching of this kind. However, this is difficult when the amount of content that must be covered is so extensive that teachers do not have time to connect with students' personal strengths and interests. The promotion of positive attitudes to learning also is more difficult when teachers are required to assess and grade each student against age-based expectations and this is prioritised over acknowledging and celebrating learning progress.

The implications of this principle are that time must be made within the school curriculum for teachers to connect with students' interests and current levels of attainment and to explain the meaning and relevance of what they are teaching. They must have time to design learning activities that spark curiosity and intrinsic interest in learning and understanding. Emotional engagement also is likely to be promoted by opportunities for students to see the improvements they are making in their learning, and by positive, constructive feedback on how they can continue to make progress.

Continuity of learning

Learning at school is ideally a continuous and seamless process through which knowledge, skills and understandings are progressively developed over time.

Underpinning this principle is a conception of learning as long-term student progress or growth in an area of learning. As students learn, they develop increasingly sophisticated knowledge, deeper conceptual understandings of subject matter, more advanced skills in applying knowledge, and higher levels of other personal attributes relevant to the learning area. Under this conception of learning, a student's knowledge, skills, understandings and attributes are developed progressively throughout their time at school with new learning building on earlier learning and laying the foundations for future learning. This process may involve revisiting material to address it in new and more sophisticated ways and to develop deeper student understandings.

Rather than being based on specified sets of outcomes that all teachers must teach and all students must learn in each year of school, a curriculum built around the concept of progression recognises that students inevitably are at widely varying levels of attainment and provides teachers with a frame of reference for establishing the points individuals have reached in their learning and ensuring that each student is provided with appropriately targeted, challenging learning opportunities.

The progression of increasing competence that underpins the curriculum in a learning area must be established from empirical evidence about the nature of student learning. It should be based on an understanding of how new learning in the area builds on prior learning and the role that prerequisite knowledge and skills play in successful further learning. It should incorporate logical sequences of content and be informed by typical paths of learning as established from analyses of actual student learning. In short, it should be built not merely from adult beliefs about appropriate orders for introducing content, but from the empirical study of how students learn in practice.

Descriptions of the progression of learning in school subjects must be developed for each subject separately because the knowledge, skills and understandings that students develop through their learning differ from subject to subject. The English Teachers Association (ETA) and the Department of Education have developed descriptions of progressions of increasing proficiency in *English in their Textual Concepts* resource. The ETA describes these progressions as 'a new way to design learning in English'. The progressions 'foreground what is at the heart of subject English' and 'make explicit what is important to teach and learn'. They have been designed to assist teachers to develop students' understandings of 'the conceptual basis of the subject', to chart the development of students' understandings of important textual concepts and processes, and to differentiate their teaching to address students' varying levels of attainment. For example, the 'Argument' progression describes students' developing understandings of the use of various forms, modes (visual, spoken, written and performative) and media to persuade others. On this progression, 'students move from the statement of personal likes and dislikes to the expression of a supported opinion and a reasoned consideration of other positions and finally to the formulation of a thesis in a sustained argument' (see Figure 11).

Such descriptions of progress capture what is central to a school subject – the core concepts, principles and ways of thinking and working that develop across the years of school. These skills and understandings usually transcend the specifics of the contexts in which they are developed. For example, students' understandings of argument could be developed through a wide variety of interchangeable contexts. The Textual Concepts resource expects students to 'practise and analyse argument in all modes and media', including reviews, poems, satire, essays, narratives, documentaries, posters, speeches, gestures, stand-up comedy, photojournalism and social media. In the study of

English literature, there may be categories of texts to which all students should be exposed, and some texts may be more appropriate at higher or lower levels of student development, but beyond this, specific texts usually are seen as convenient but interchangeable contexts for developing the understandings and skills at the heart of the study of literature. Or in history, while there may be specific historical facts or periods about which all students should learn at some point in their schooling, the analytical skills and deep understandings and thinking at the heart of the subject history usually could be developed in any number of contexts, such as the American Civil War, the Ming dynasty, colonial Australia or the French Revolution.

Continuity and seamlessness are central ideas in this conceptualisation of learning. Learning is seen as a continuous and potentially ongoing process. In this context, divisions of learning into phases (from pre-school to post-school) and stages are artificial impositions on an ideally continuous process. Phases and stages were introduced historically as responses to public demand for access to increasing levels of education. But the approaches to curriculum, teaching and assessment that were developed for these different stages are often different, and students can experience serious disjunctures in their learning at the transitions between them – especially from pre-school to Kindergarten, Year 6 to Year 7, and from Year 12 to post-school study. Years of school also are imposed divisions that can produce discontinuities in learning, especially if teachers believe their role is to deliver the same year-level content to all students with limited attention to individuals' current levels of attainment and readiness.

This conceptualisation of learning as a continuous process, coupled with the fact that students in the same year of school are at widely varying points in their long-term progress, is at odds with a curriculum structure that generally expects teachers to teach, and all students to master, an identical set of year-level syllabus outcomes. And for at least some students, this structure creates discontinuities in learning across largely arbitrary transitions.

The implications of this principle for curriculum design are that clarity is required about the nature of long-term progress in a learning area. There needs to be an explicit and shared understanding by teachers of what deeper knowledge, more sophisticated understandings and higher level skills look like in an area of learning – in other words, of the nature of increasing competence, proficiency or attainment in the learning area. The curriculum must make this progression explicit and easy to understand, and it must do this by describing and illustrating the progress students are expected to make towards higher levels of attainment or expertise during their time at school. This shared understanding of the progression of learning should inform efforts to ensure greater seamlessness of learning and to minimise the impact of transitions between stages and years of school.

Recognition of diversity

Teaching is more effective when it takes account of students' backgrounds, starting points, strengths and learning needs.

This principle places students and their needs at the centre of the teaching and learning process. What teachers teach at any particular time, how they teach it, and how long they spend teaching it are not centrally prescribed, but are decided by teachers in response to students' particular circumstances and learning needs. This principle recognises that students have widely varying backgrounds, levels of attainment and learning needs and that teaching is more likely to lead to successful learning when it acknowledges and responds to this variability. Again, the design of the curriculum can make this easier or harder for teachers to do.

In contrast to this principle are approaches that place the curriculum at the centre of the teaching and learning process. Under these approaches, the curriculum is treated as relatively fixed. Syllabuses spell out what teachers are to teach and all students are to learn and how much time they are to spend doing this. This is often considered 'equitable' and the best way to lift standards in schools. All students are held to identical expectations and are assessed and graded on how well they master year-level syllabus outcomes. Equity is defined as 'equal treatment' and the same learning expectations are assumed appropriate for every student. When it becomes obvious that syllabus expectations are not appropriate for some students, the usual response is to create an alternative syllabus for that student sub-group. But these alternative (usually 'easier') courses invariably lower expectations, risk categorising and labelling students, and often impose ceilings on how far individuals can progress in their learning.

Stage 6: Students appreciate the elegance of argument as a scholarly conversation conveying us from familiar knowledge to new perceptions. They learn that: an argument acknowledges and synthesises a range of ideas and perspectives; arguments that rely on assumptions are not necessarily well-founded; arguments transform concrete details into abstractions; arguments, in different forms, modes and media, convince in different ways; the narrative may present arguments through its thematic concerns; components of argument build on and respond to one another in an act of creativity; and argument achieves unity through the interplay of logical development and aesthetic and rhetorical features.

Stage 5: Students understand that the thrust and shape of argument is influenced by the contexts of composition and reception. They learn that: argument is the logical development of a supported thesis with the purpose of bringing audiences to a new intellectual or emotional understanding; rhetorical devices are chosen for their effect for particular audiences and purposes; and arguments, despite claims to objectivity, come from a particular perspective.

Stage 4: Students understand that argument is the deliberate staging of ideas and feelings, through spoken, visual and written language, in the development of a thesis to influence a response. They learn that: argument can be a projection of the individual voice in an individual style; judicious choice of evidence and language develop the strength of an argument; and a thesis and supporting evidence of an argument provide the framework on which its conclusions are based.

Stage 3: Students understand that an argument takes into account audience, form and purpose. They learn that: arguments can be objectively or subjectively presented; language choices (visual, spoken and written) can strengthen arguments; and an argument may provide an informed assessment of a range of opinions.

Stage 2: Students understand that opinions should be supported by information and ideas presented in a structured way. They learn that: opinions can be refined through negotiation with others; paragraphs contain a single idea; paragraphs are made up of topic sentences and evidence; and certain language (e.g. description, modality, aspects of images) carries a persuasive force.

Stage 1: Students understand that ideas, information and images need to be expressed in a clear and organised way. They learn that: certain phrases (e.g. I think that...I know that...) project opinion; images can reinforce ideas; and arguments are expressed through different types of texts, modes and media.

Early Stage 1: Students have opinions about texts and issues.

Figure 11 English textual concepts learning progression⁶⁹

The principle being described here assumes a common, inclusive curriculum but recognises that students are at very different points in their progress through that curriculum and often make progress at different rates. It also recognises that students have varying cultural and language backgrounds and that these can result in mismatches between the assumptions and expectations of schools and those of local communities, and so place some students at a disadvantage. Effective teaching recognises and takes advantage of students' varying backgrounds and starting points, adapting and contextualising the content of the curriculum as appropriate. Equity is defined not as equal treatment but as adaptation to ensure that every student's learning needs are equally identified and addressed. However, there must be flexibility in the curriculum to allow teachers to do this, as well as willingness to consider the relevance and appropriateness of curriculum expectations for all students.

⁶⁹ NSW Department of Education & English Teachers' Association of NSW, *English textual concepts: argument*, English Textual Concepts, 2016, viewed 26 July 2019, <<http://englishtextualconcepts.nsw.edu.au/content/argument>>.

The identification of appropriate starting points for teaching and learning also is made necessary by the fact that the most advanced ten per cent of students in each year of school are typically five to six years ahead of the least advanced ten per cent of students. In other words, in any year of school, at any given time, there is enormous variability in students' levels of attainment. This is significant because, to maximise the likelihood of successful learning, individual students require learning opportunities at an appropriate level of challenge – not within their comfort zones and not so far ahead of them that they lack the prerequisites for success, but at a level where they are stretched and may require assistance to succeed. When all students in the same year of school are held to identical syllabus expectations, there is a risk that the least advanced students will struggle and fall further behind in their learning and the most advanced students will be inadequately challenged and not achieve their potential.

Access to an inclusive curriculum, the identification of current levels of attainment and next steps in teaching and learning, high expectations for progress and long-term achievement, and targeted interventions and accommodations that address individual learning needs are equally essential for students with disabilities and learning difficulties. And for every student, the diagnosis of learning gaps, misunderstandings and errors is likely to be an important part of teachers' work in ascertaining where individuals are in their learning.

For teachers, the challenges of understanding students' varying backgrounds and starting points and of meeting individuals at their points of need are much greater than the challenge of delivering the same year-level syllabus to everybody. But a large body of international research identifies such teaching as essential to ensuring that every student learns successfully.

The implications of this principle for curriculum design are that the school curriculum must provide flexibility for teachers to establish and understand students' backgrounds and starting points and to teach accordingly. It must be designed in a way that not only enables but also promotes such teaching. Curriculum design must support the more effective teaching and learning that results from taking into consideration students' cultural and language backgrounds, making connections to local contexts and issues, and slowing down or speeding up teaching depending on student needs.

Personal learning goals

Learning is promoted by clear, appropriately challenging learning goals, with support for students to plan and monitor their own learning progress.

Successful learning is more likely when students work in an environment in which they are emotionally engaged and personally challenged, and when they can see the relevance and purpose of what they are learning. Learning also is more likely when students understand what is expected of them, know what success looks like and are able to monitor and reflect on their own learning achievements and progress.

Appropriate goals are a key to successful learning. Goals must be challenging, achievable and appropriate to students' current levels of attainment and learning needs. They must provide stretch targets that build on and extend prior learning. The setting of goals at an appropriate level is a critical feature of effective teaching; students do not learn effectively when taught what they already know or what they are not yet ready to learn. The importance of this principle is often underestimated in practice. Much time and energy can be spent on off-target teaching and learning.

An implication of this principle is that learning goals must be appropriate to individual learners. Because students are at different points in their long-term progress, goals at an appropriate level for some students often are insufficiently challenging for more advanced students but too challenging for less advanced students. An ongoing task for teachers is to ensure that every student is provided with demanding but realistic learning challenges that stretch and extend them and that maximise the likelihood of their success in further learning.

Near-term learning goals, rather than long-term goals, are likely to be more effective for motivating effort, providing useful feedback, allowing students to monitor their own progress and providing an ongoing sense of accomplishment. Students' confidence in their ability to learn successfully and views of themselves as learners are promoted by their ability to set short-term goals for learning and to monitor progress in achieving those goals.

Direct student involvement in goal setting usually is beneficial to motivation and engagement. In contexts outside school – for example, in game environments and sporting contexts – students commonly expect to be able to personalise activities and challenges, to set targets for improvement, and to monitor and record personal bests. In contrast, learning at school often does not provide opportunities for students to set personal goals, to decide when they will demonstrate achievement or to monitor personal improvement over time. This is not simply a matter of pedagogy; the structuring of the school curriculum and the way students progress through the curriculum can make it easier or harder for teachers and students to set personalised learning targets and to monitor long-term progress in an area of learning.

The implications of this principle are that the school curriculum should be designed to enable appropriately challenging learning goals to be set for individual students. The setting of next steps in learning and goals for attainment is ideally a process that includes both teachers and individual learners. Curriculum design should facilitate personalised goal setting and provide a basis for monitoring learning progress over time. Curricula based on a design that expects teachers to deliver the same curriculum content to all students in the same year level and to assess and grade performances on this common content generally do not provide an adequate basis for setting and monitoring the achievement of personal learning goals.

Curriculum flexibility

Within a clear framework of expectations, teachers should have flexibility to decide what to teach, when and how to teach it, and how much time to spend teaching it.

The prescribed school curriculum must provide sufficient flexibility for teachers to adapt their teaching to the circumstances and needs of the students in their care. Flexibility enables teachers to connect with individual learners' starting points, interests, strengths and learning needs and so is a key to maximising every student's chances of learning successfully.

There is always a tension in school curricula between the specification of essential common content and flexibility for teachers to tailor what they teach to students' varying backgrounds, circumstances and levels of attainment. A balance must be struck between these two considerations. A question of any school curriculum at any time is whether it specifies an appropriate common entitlement while also giving teachers adequate flexibility to address individual learning needs.

An inflexible curriculum limits teachers' opportunities to tailor their teaching, usually because it fills available teaching time with mandated subjects and topics, requires schools to address social issues not being addressed elsewhere, specifies large numbers of syllabus outcomes, and constrains when content is to be taught and how much time is to be spent teaching it.

In practice, examples can be found of both extreme prescriptiveness and extreme flexibility. One extreme sees the curriculum as a detailed blueprint and is based on a belief that, if all teachers deliver centrally prescribed content in optimal ways, then student learning will be maximised. The other extreme gives teachers and students unfettered freedom to decide what to teach and learn based on local contexts and personal interests. Most curriculum designers consider neither extreme to be in the best interests of all students.

One indication that a curriculum is overly prescriptive is concern by teachers that they are unable to adapt their teaching adequately to meet the learning needs of students. Teachers may say they have difficulty teaching all mandated content; have insufficient time to teach in depth or to explain the relevance and application of what they are teaching; are unable to slow down teaching to ensure that students have understood and to reteach when required; do not have flexibility to tailor teaching to students' differing starting points and backgrounds; and lack time to work with individuals or to provide quality feedback.

In contexts in which the school curriculum is overly prescribed, teachers tend to focus on 'delivering' the year-level curriculum. The priority is to ensure that all syllabus outcomes are covered and every student is exposed to, and has an opportunity to learn, the mandated content. Under time pressure, teachers may find it difficult to differentiate their teaching and to respond to students' varying levels of attainment and learning needs. High levels of prescriptiveness can erode time to establish and understand where individuals are in their learning and to tailor teaching and learning accordingly.

When teachers are required – or feel they are required – to cover large amounts of content, they are less likely to focus their teaching on fundamental concepts and principles at the core of a subject and around which factual and procedural knowledge can be organised. Instead, all content may be treated as more or less equally important. High levels of curriculum specification reduce teachers' time to build students' deep understandings by revisiting and illustrating concepts in a variety of contexts.

A lack of flexibility also limits students' abilities to investigate practical applications of what they are learning, to pursue personal strengths and interests and to build skills in applying knowledge. When syllabuses contain large numbers of outcomes that teachers are required to teach and students are expected to learn, open-ended activities that require significant time – such as the team-based solution of complex problems or major research projects – can be difficult to accommodate. In this way, high levels of curriculum specification can limit students' understandings of how learning is applied and restrict opportunities to develop skills in knowledge application.

The implications of this principle for curriculum design are that a crucial balance must be struck between the specification of essential curriculum content and the flexibility that teachers require to adapt what they teach, when they teach, and how long they spend teaching to the backgrounds, starting points and learning needs of individual students.

Informative assessment

Assessments should provide quality information about the points individuals have reached in their learning and the progress they are making toward the achievement of high standards.

Approaches to assessing and reporting student achievement have powerful influences – both positive and negative – on the kinds of teaching and learning that occur in schools. An important principle is that assessment processes should embody and promote what is known from learning research about the conditions necessary for highly effective teaching and learning.

A first implication is that assessment processes should promote teaching and learning for understanding. They should promote and provide information about students' mastery of core factual and procedural knowledge in a subject, as well as their understandings of fundamental concepts and principles. The assessment of a narrower range of deep knowledge and understanding should be prioritised over the assessment of superficial recall of large amounts of information.

Assessments should also include an evaluation of students' understandings of the contexts to which core knowledge and understandings can be transferred and applied, and students' skills in applying knowledge. These skills include the ability to gather, analyse and interpret relevant information; think critically and creatively to address issues or solve problems; plan and undertake investigations; communicate and collaborate with others; make relevant uses of technologies; and draw and report conclusions. Assessments of students' abilities to transfer and apply knowledge should be an integral part of assessment in every school subject throughout the years of school.

Assessment processes should promote intrinsically motivated learning and mastery rather than extrinsically motivated performance. As far as possible, assessments should encourage learning for its own sake, including willingness to take risks and make mistakes, rather than encouraging a focus on comparative performance, risk aversion and fear of failure. Assessment processes should also build students' understandings of the relationship between effort and success and confidence in their own abilities to learn successfully (that is, a 'growth mindset').

Findings from learning research underscore the importance of teachers establishing where students are in their learning to guide next steps in teaching and learning. This is a core purpose of assessment. It includes establishing the points individuals have reached in their learning in a subject (that is, their overall levels of knowledge, skill and understanding), as well as the more detailed diagnosis of problems learners are having, misunderstandings they have developed or skills they have not yet mastered.

Assessments should encourage students' sense of autonomy and control over their own learning and provide opportunities for metacognitive behaviours such as goal setting and monitoring learning progress, including the ability to reflect on long-term improvements.

Common approaches to assessing and reporting learning in schools fall short on most of these criteria. One reason is that, rather than being designed to establish, diagnose and understand where individuals are in their long-term progress in an area of learning and to monitor the progress they make over time, most assessment processes are designed to establish how well students have learnt what they have just been taught. The assessment process is typically seen as a process of judging learning success. If a student can demonstrate most of what has been taught, they are rewarded with a high mark or grade.

There are obvious consequences of this approach. Less advanced students are judged and graded year after year against year-level curriculum content for which they often are not yet ready. Many receive low grades year after year, failing to reflect the progress they are making and sending a strong message that they are poor learners. Some eventually disengage. Parents are aware that these students are performing below year-level expectations but often are not aware of just how far behind they have slipped.

On the other hand, more advanced students tend to receive high grades on year-level expectations year after year. These students start each school year ahead of most other students. For many, the year-level expectations are insufficiently challenging, with some achieving high grades (and perhaps coming to expect high grades) with limited effort. Parents are aware that these students are performing well on year-level expectations but often are not aware of the higher levels of which they are capable.

A focus on judging and grading often encourages a performance orientation and extrinsically motivated learning. Students are more focused on how they perform against year-level expectations and other students than on where they are in their learning, what progress they have made, and what they need to do next. By defining learning success only as performance against year-level standards, assessment processes also restrict students' abilities to see the long-term progress they are making and to exercise greater control over their learning by setting personal learning goals and monitoring learning progress.

The implications for curriculum design include the need to structure the curriculum in a way that permits teachers, students and parents to see where individuals are in their long-term learning progress, to set realistic but challenging goals for further learning and to monitor the progress being made toward high levels of attainment. The supporting role of assessment is to establish the points individuals have reached in their learning, to illuminate the progress they have made, and to diagnose obstacles to further progress. Feedback to students and parents should communicate this information.

Student agency

Opportunities for students to build on their strengths and pursue personal interests and passions improve student motivation and engagement.

The degree of autonomy students have in shaping and directing their own learning is an important determinant of attitudes to learning, motivation, engagement and perseverance. When students have a level of control over what and how they learn – that is, a level of 'agency' as learners – they also are supported to develop skills in self-regulation and independent learning and are likely to develop higher levels of self-confidence.

A common complaint among school students is that they do not see the relevance of what they are learning. This often results in lack of interest and disengagement and is likely to be exacerbated if students feel they are passive recipients of transmissive teaching that has little connection to their everyday lives. In contrast, students have come to expect the world outside school (especially social media environments and online games) to provide high levels of personalisation and control, as well as immediate feedback and gratification. Schools increasingly compete for students' time and attention with alternatives designed to be highly engaging and sometimes addictive.

In this context, it is important that schools empower students to become more self-directed in their learning, exercising a degree of choice, taking initiative, and pursuing personal interests and strengths. Within clear goals for learning, the perennial challenge is to promote student curiosity and intrinsically motivated learning through relevant and meaningful learning opportunities.

Students have a degree of control over their learning when, beyond a guaranteed common core of learning, they are able to choose the subjects they study and the timing of those subjects. Project-based learning also provides important opportunities for greater student agency as students shape and drive the questions or topics they will address, the processes they will follow, and the nature of the products of their work.

Providing students with greater decision making in their learning is not the same as expecting students to 'discover' facts, concepts, relationships and principles for themselves. This latter approach, sometimes referred to as 'discovery learning', also emphasises the value of learning through application and experience, but is based on the idea that students need to 'construct' knowledge for themselves, often through trial and error.

As with many other aspects of teaching and learning, decisions about appropriate degrees of student choice are a matter of balance. The challenge is to strike a balance between learning that is entirely passive and receptive, and the expectation that students left alone to explore through hands-on learning will discover for themselves. Increased levels of student choice and control over their learning are best provided in a context of clear learning expectations and accountabilities and close teacher supervision, monitoring and intervention when required.

The implications for curriculum design are that, beyond ensuring that every student has access to a common entitlement of learning (that is, opportunities to learn an identified core of subject knowledge and skills), students should be given freedom of choice to build on strengths and personal interests. Within subjects, opportunities for students to make choices from optional topics and to choose problems and research topics aligned with their interests are likely to lead to higher levels of motivation, engagement and attainment.

Integrated learning

All school subjects, including in the later years of school, should combine theory and application and be of similar rigour and demand, minimising academic/vocational and knowledge/skills distinctions.

Underpinning this principle is the intention that every school subject, including every subject in the senior years of school, should be designed to contribute to a student's broad education by developing subject knowledge and understandings, skills in applying knowledge, as well as relevant personal attributes. In this sense, every subject should adopt an integrated approach to the development of knowledge, skills and attributes and, in the later years of school, should be designed to prepare students simultaneously for further study, life and work.

In contrast to this intention would be subjects that are narrow in their focus – for example, subjects focused only on providing knowledge required for post-school study in the same subject, or only on providing skills required for a particular post-school occupation. Most existing school subjects have a stated intention to develop a range of knowledge, skills and attributes. The point of this principle is to ensure that every subject provides significant breadth of learning in practice.

Working against this principle of integration are dichotomies that have emerged in the school curriculum. One of these dichotomies distinguishes a focus on teaching and learning disciplinary knowledge from a focus on developing general skills and capabilities such as problem solving, entrepreneurial skills, research skills, creativity, critical thinking, communicating and teamwork. At one extreme, advocates of traditional disciplinary knowledge often are dismissive of what they see as the undervaluing of accumulated human wisdom in favour of 'soft' and fuzzily defined 'capabilities'. At the other extreme, advocates of '21st century skills' see these as the skills required to function in modern workplaces and in a rapidly changing world, and may consider disciplinary knowledge to be easily accessible through technology and at risk of becoming redundant.

The principle of integrated learning seeks to eliminate this dichotomy by viewing the application of knowledge (and skills in knowledge application) as an integral part of learning and competence in a subject. Within each subject, students should be given opportunities to explore meaningful applications of what they are learning. This may include applying knowledge to the solution of problems or in the context of student projects. These applications provide contexts in which skills such as problem solving, critical and creative thinking, teamwork and communicating can be developed and demonstrated.

Rather than giving these skills labels such as 'general capabilities', 'key competencies' or '21st century skills', thereby making them seem separate and perhaps in competition with disciplinary learning, an integrated view of the curriculum sees skills in applying knowledge as an essential part of disciplinary learning and a requirement for high levels of competence in every subject.

A second dichotomy working against the principle of integration is the distinction between 'academic' and 'vocational' learning – currently a feature of the curriculum in the senior years. This distinction generally differentiates subjects considered to provide a foundation for university study from subjects that provide a foundation for vocational study or direct entry to work, although this distinction is often blurred with students pursuing many different paths to vocational and higher education qualifications and careers. Nevertheless, vocational subjects in the senior years commonly are perceived as lower-level subjects available to 'non-academic' students not aspiring to an ATAR.

The current academic-vocational distinction can lead to a narrowing of students' experiences as they focus on specific purposes for their learning. Some students' learning is narrowly focused on achieving the highest possible ATAR. This may include taking subjects that are not well suited to students' interests or abilities but are perceived to improve their chances of a high rank. Other students' learning is narrowly focused on acquiring skills for a specific job, even when the long-term future of that occupation may be in doubt. These instrumental purposes for learning often hinder the provision of a broad, general education to every student in the senior years of school.

The principle of integrated learning seeks to eliminate this dichotomy by making every subject in the senior years a rigorous, high quality course that integrates and prioritises both theory and application. For some subjects, this will mean introducing a greater focus on practical applications and skills in knowledge application. For others, it will mean a greater focus on the theory underpinning practical applications. The ultimate objective is parity of esteem for all subjects, achieved through rigorous, integrated learning in every subject.

The implications of this principle for curriculum design are that every school subject should be designed to contribute to a broad education by incorporating both theory and application; by integrating knowledge, skills and attributes; and, in the senior years of school, by simultaneously preparing students for further study, life and work. In these ways, every effort should be made to minimise currently unhelpful knowledge/skills and academic/vocational distinctions.

7. ESSENTIAL FEATURES OF THE NEW CURRICULUM

Based on community consultations and submissions to the Review, and feedback on reform directions canvassed in an Interim Report, the Review is recommending a significant redesign of the NSW school curriculum. This redesign is informed by the design principles outlined in the previous section. Given the extent of the recommended changes, the new curriculum arrangements will need to be phased in over an extended period of time, and teachers will need to be provided with professional development and support. This section describes the essential features of the new curriculum.

The Review is recommending a significant redesign of the NSW curriculum.

The proposed redesign is guided by a set of principles relevant to all areas of learning across all years of school – from Kindergarten to Year 12. These principles give rise to a set of 'design features' for the new curriculum. This section explains these features and the principles that underpin them.

Key design features

The curriculum being recommended by the Review has four interrelated and mutually supportive design features. These features are briefly summarised below and each is then elaborated in more detail.

Strong foundations for learning, life and work

A first feature of the new curriculum is its design to provide every student, in each phase of learning, with strong foundations for what comes next. The ultimate aim is to ensure every student leaves school well prepared for a lifetime of ongoing learning and informed and active citizenship and with knowledge, skills and attributes that will help equip them for meaningful work and satisfying careers. Underpinning this design is recognition that there are currently significant costs to individuals and society when students fall behind in their learning and leave school with inadequate levels of attainment.

In the early years of school, the new curriculum builds on the Early Years Learning Framework and prioritises the mastery of foundational knowledge and skills, especially in oral language, reading and mathematics. A high priority is also given to children's social and emotional development and wellbeing. These are recognised as essential foundations for successful learning in the subsequent years of school. The new curriculum is designed to help teachers establish where young children are in their learning of these skills and to identify their current learning needs, with the intention of every student being on track as early as possible in their schooling.

In the middle years of school, the new curriculum maintains existing subject requirements and a strong discipline focus. These are recognised as essential to a rounded education and crucial foundations for advanced and specialised learning in the later years. Standards are introduced to specify the levels of attainment students are expected to reach in the subjects of this common curriculum. And, in preparing students for an increasingly interconnected world, the new curriculum gives greater emphasis to the learning of languages other than English and to ensuring every student has a sound understanding of Aboriginal cultures and histories.

In the later years of school, every subject in the new curriculum is designed to develop high levels of knowledge as well as advanced skills in using that knowledge. These are recognised as essential foundations for post-school learning and the world of work. Past distinctions between knowledge and skills, theory and practice, and academic and vocational learning are replaced by rigorous, high-quality HSC subjects each of which integrates theory and the application of theory. The new curriculum is designed to provide every student with opportunities to pursue their strengths and interests, and to develop strong foundations for post-school learning, adult life and future careers.

Learning with understanding

A second feature of the new curriculum is its strong focus on ensuring students learn with understanding. This is achieved by giving greater priority in newly designed syllabuses to fundamental concepts and principles in each subject and by providing opportunities for students to see how these concepts and principles can be applied in a range of meaningful contexts. In many subjects, this means emphasising depth rather than breadth of learning. Rather than attempting to cover large amounts of factual and procedural content, the syllabuses of the new curriculum (referred to as 'new syllabuses') focus on a smaller set of core factual knowledge, concepts and principles and are designed to develop increasingly deep understandings of these over time.

The objectives here are to: focus new syllabuses on what is essential to each subject; address concerns about 'overcrowded' syllabuses that require large amounts of material to be covered in limited amounts of time, thereby encouraging more superficial forms of teaching and learning; provide opportunities for students to develop deeper understandings of content through the transfer and application of their learning to a range of situations and problems; and enhance engagement and enjoyment of learning by keeping rote learning to a minimum and assisting students to see the meaning and relevance of what they are learning.

This feature of the new curriculum requires the identification of core content in each subject and the design of new syllabuses around this core. The prioritised factual and procedural knowledge is knowledge required for further learning in a subject. The prioritised concepts and principles are those around which knowledge is organised and that are developed and understood in increasing depth over time.

Skills in applying knowledge

A third feature of the new curriculum is its design to give greater attention, in every learning area, to skills in using knowledge. This feature applies both to learning areas of the common curriculum that all students undertake, usually for the first ten or eleven years of school, and also to more specialised subjects that extend and build on subjects of the common curriculum in the later years of school.

New syllabuses are designed not only to develop increasingly sophisticated knowledge and deeper understanding of an area of learning, but also skills in applying that knowledge. No subject is focused solely on developing knowledge or solely on developing skills; theory and the application of theory are seen as intertwined and essential features of every subject.

Skills in applying knowledge include subject-specific skills, but also skills in using technologies, sourcing and analysing information, critical and creative thinking, collaborating, and communicating. The new curriculum specifies how students' skills in applying knowledge are to be developed in parallel with their advancing knowledge and understanding of each subject. Rather than being taught or assessed separately from subjects, such skills are incorporated into new syllabuses and are an integral part of developing competence in each subject.

The development and demonstration of these skills depends on opportunities for students to put their subject knowledge and understandings to work, for example, through practical applications, problem solving activities or investigative projects. In these ways, students build and extend their subject knowledge, and also develop an important range of skills in using that knowledge.

Excellent ongoing progress

A fourth feature of the new curriculum is its design to ensure every student makes excellent ongoing progress in their learning. This feature is a response to the observation that existing syllabuses are time-limited, meaning that many students are required to move to the next syllabus before they have mastered the current syllabus. These students often fall increasingly far behind with each year of school and fail to make the progress they otherwise could. Many other students are not adequately challenged by their current syllabus and are ready for the next. These students often mark time and also do not make the progress they are capable of making.

New syllabuses are untimed. They do not specify when every student must commence, or how long they have to learn, any given syllabus. Students progress to the next syllabus once they have mastered the prior syllabus. Students who require more time have it; students ready to advance are able to do so. Teachers determine when students have achieved a syllabus and are ready to move to the next. Descriptions and examples of student performances that demonstrate achievement of the syllabus, and accompanying assessment resources, assist teachers to make these decisions.

In the new curriculum, students in the same year of school may be working on different syllabuses at the same time. The underlying principle is that learning is maximised when learners are presented with appropriately challenging material, rather than being under-challenged by what they already know or over-challenged by what they are not yet ready to learn. This feature of the new curriculum recognises that successful learning is more likely when the goals of learning for individuals are clear, realistically challenging, and achievable on relatively short timelines. For some students, progress through two (or in exceptional cases three) 'new syllabuses' in a school year may not be unrealistic.

This approach also promotes a growth orientation. In each subject, new syllabuses define a clear path of learning for every student. They assist students to see where they are in their long-term progress and to recognise and celebrate progress – both within a syllabus and from one syllabus to the next.

Strong foundations for learning, life and work

A fundamental purpose of schooling is to prepare every young person with knowledge, skills, attitudes and values that will assist them to take their place in adult society as caring, informed and active citizens, to continue learning throughout life, and to engage in fulfilling and productive work. This central purpose is pursued across the years of school. The intention of the curriculum is for students to develop progressively higher levels of knowledge, understanding and skill, and increasingly mature attitudes and values, throughout their time at school. Each phase of schooling is intended to contribute to this purpose by building on prior learning and establishing solid foundations for the next phase of learning.

However, this intention for learning at school currently is not realised for many students. An unacceptably large number of students complete school with inadequate levels of achievement. Some lack basic skills in reading, writing and mathematics. Others lack the high-level skills future workplaces will require of school graduates. Many students complete each phase of school without establishing necessary foundations for the next phase and, as a result, struggle and fall further behind in their learning.

Students arrive at school at different stages in their learning. While most children are on track, some are significantly behind because of developmental delays and disadvantaged backgrounds, meaning that they are not ready for the curriculum teachers are about to teach. If the learning needs of these children are not identified and addressed during the early years of school, they often fail to master even basic skills and remain on trajectories of low attainment throughout their schooling.

By the middle years of school, students are taught syllabuses that sometimes contain large amounts of content delivered on tightly prescribed timelines. The assumption is usually made that every student is more or less equally ready to learn this content. However, students who did not develop basic skills in the early years inevitably struggle. Other students now also slip behind in their learning and begin to disengage, with some falling further behind with each successive year. The OECD estimates that, by 15 years of age, 22 per cent of NSW students lack the reading skills, and 24 per cent lack the mathematics skills necessary for everyday functioning.⁷⁰

In the final years of school, learning for most students is focused on preparing for HSC examinations, maximising ATAR and entering university. For these students there is often a strong focus on acquiring knowledge. Learning for other students is focused on vocational pathways and the requirements of particular occupations. For these students there is often a strong focus on acquiring skills. For both groups, there can be a narrowness to learning in these final years, raising a question about how well the current curriculum equips every student with the knowledge, skills and attributes they will require for life after school.

⁷⁰ Thomson, S, De Bortoli, L, Underwood, C & Schmid, M (2019). *PISA in Brief: Student Performance*. Melbourne: Australian Council for Educational Research.

School is about more than preparing for life after school or the next phase of learning. It is a significant and important part of every person's life and should be stimulating and enjoyable in its own right. But each phase of learning also is designed to contribute to an individual's ongoing growth and development and to lay the foundations for further learning.

How well each phase of learning prepares students for the next phase depends on the design of the curriculum. Factors such as the sequencing of content, the volume of material students are expected to learn, identified learning priorities, explicit standards and expectations, and the time available for learning all influence individual student success and readiness for further learning. A defining feature of the new curriculum is its goal of ensuring every student establishes strong foundations in each phase of learning and so is well prepared for what comes next.

Building foundations in the early years

The early years of school are crucial in establishing foundations for future learning success. Children commence school with widely varying levels of social and emotional maturity, language and mathematics skills, cognitive development and psychomotor development. The challenge in these early years is to ensure every child, especially those with developmental delays, from disadvantaged backgrounds and/or those who have not had quality early childhood education experiences gets off to a good start and builds the foundations for subsequent success at school.

The new curriculum makes this a priority. It does this first by giving precedence to foundational aspects of children's learning and development: their social and emotional development, oral language skills, early reading skills, and early mathematics knowledge and skills. These are prioritised over all other areas of the school curriculum, particularly for children who are less advanced in these aspects of their development. This is not to say that other areas of learning are not important. They are. The curriculum does not propose that children spend inordinate amounts of time on reading and mathematics to the exclusion of other aspects of learning, including physical activity, play, music and art. However, given their importance as foundations for future success at school, these prioritised areas of learning are singled out in the new curriculum for special attention, particularly for children who require it.

Second, the new curriculum recognises that teachers require flexibility to respond to children's widely varying levels of development and learning needs. A key to ensuring every child establishes strong foundations in the early years is to identify the points they have reached in their learning – for example, the extent to which they have mastered early reading skills – and to tailor teaching accordingly. Rather than assuming every child in the same year of school is ready for the same year-level syllabus, the new curriculum is redesigned to support teachers to identify the stages individuals have reached in their learning so that they can respond flexibly to their different learning needs. This includes ensuring more advanced children are challenged to the levels of which they are capable.

Building foundations in the middle years

During the middle years of school every student studies a set of mandated subjects. These subjects are intended to build students' understandings of themselves, society and the wider world, and to provide exposure to important bodies of human knowledge. The subjects of this common curriculum provide essential foundations for learning in the later years of school and for life more generally.

Currently, students in NSW primary schools study six Key Learning Areas each year: English, Mathematics, Science and Technology, Human Society and its Environment, Creative and Practical Arts (including Art and Music), and Personal Development Health and Physical Education. Students in the lower secondary school study English, Mathematics, Science, and Human Society and its Environment each year, together with two of: Languages other than English, Technological and Applied Studies, Creative Arts, and Personal Development, Health and Physical Education.

The new curriculum maintains this existing set of subjects. However, many students during these middle years currently do not achieve intended levels of learning in mandated subjects. The OECD has identified minimally acceptable levels of attainment in reading, mathematics and science by 15 years of age. Between one in five and one in four students in NSW do not reach these levels, and these percentages have been increasing steadily over the past two decades. For these students, the common curriculum of the middle years does not build strong foundations for life or further learning at school.

The new curriculum is designed to address this challenge. It does this first by providing teachers with an improved basis for monitoring students' long-term progress in their learning of subjects and for identifying students who are not on track and slipping behind. Second, it sets clear standards that every student is expected to achieve in these subjects by the completion of their schooling – something that does not exist currently. And third, it refocuses learning in these subjects by reducing the volume of material teachers are expected to teach and students are expected to learn and prioritising instead the development of deep understandings of core facts, concepts and principles.

In addition, the new curriculum expects students to achieve at least a minimum level of proficiency in a second language by commencing language learning during their primary years. The goal of language learning in the new curriculum is to provide every student with some knowledge of a second language and to lay the foundations for an increased number of students to pursue more advanced levels of proficiency, particularly in languages of the region, such as Mandarin and Indonesian.

The curriculum also expects every student during the middle years to develop a common understanding and appreciation of Aboriginal cultures and histories. These are seen as essential foundations for informed adult citizenship in Australia.

Building foundations in the later years

During the later years of school, the focus of student learning currently is on preparation for particular post-school destinations. For most students, this means working to achieve entry to a desired higher education course. For others, it means preparing for work. During these years, students undertake programs of study that reflect their aspirations, interests and perceived capabilities.

There is a strong divide in these years between academic and vocational learning. These two kinds of preparation are based on different intended outcomes, curricular approaches, pedagogies, and forms of assessment. In one case, the focus is primarily on acquiring knowledge to be tested in final examinations which determine a student's ATAR and thus likelihood of being selected into a university course of choice. In the other, the focus is primarily on acquiring skills that must be demonstrated and confirmed in practice and that usually are determined by the requirements of externally provided vocational qualifications. There is also a clear hierarchy; most students and parents see the academic pathway as preferable to the vocational pathway, which tends to be viewed as more appropriate for 'less able' students.

It is not obvious that these existing arrangements provide the strong foundations that every student now requires for further learning, adult life and the world of work. Both provide relatively narrow preparations in their own way, either driven by the needs of universities or by industry bodies. They also promote artificial and unhelpful distinctions between knowledge and skills, theory and practice, and academic and vocational learning. The new curriculum aims to ensure that every student in the later years of school develops advanced knowledge in chosen areas of study, skills in applying that knowledge, and attributes to equip them for life and future careers.

Central to the new curriculum in the later years is a limited number of rigorous, high quality HSC subjects that integrate theory and the application of theory. The mix of theory and practice varies from subject to subject, but advanced knowledge and advanced skills are features of every subject. Vocational learning is not quarantined to a set of VET subjects, but is seen as relevant to every student and area of learning. Skills such as problem solving, working in teams, collaborating, communicating, and thinking critically and creatively are promoted in all subjects and are also developed and demonstrated through a major investigative project that every student undertakes.

Learning with understanding

The quality of the foundations students establish in each phase of school depends on how deeply they understand what they are learning. When students learn superficially – for example, when they memorise material with little understanding of its meaning – weak foundations for further learning are built. Strong foundations depend on deep learning of the kind that occurs when students grasp principles that underpin what they are learning, recognise important organising concepts, develop more sophisticated mental models of phenomena, and better understand the contexts to which learning can be applied, including the limits of its application. Deep learning usually occurs over extended periods of time through multiple opportunities to see how what is being learnt can be applied in a range of contexts.

Many students in NSW schools currently do not develop deep understandings of what they are taught. Evidence for this is provided by the OECD's Programme for International Student Assessment (PISA) which assesses 15 year olds' abilities to apply concepts in mathematics, science and reading in everyday situations. The OECD identifies minimum standards it considers necessary to function effectively in everyday life. In mathematics, the percentage of NSW 15 year olds failing to meet this standard increased from 14 per cent in 2003 to 24 per cent in 2018. Based on OECD evidence, a growing percentage of NSW students are completing the middle years of school with limited conceptual understanding in key school subjects.

This matters because deep understanding is essential to successful further learning and is likely to be increasingly important for life after school. With facts now more accessible through technology, and routine activities increasingly being performed by machines, work of the future will require employees with deep understandings of subject matter who can think critically about problems and use their understandings to create new solutions. Superficial learning and memorisation without understanding will not equip students adequately for life or the rapidly changing world of work.

Learning with understanding is less likely when students are focused on memorising large volumes of factual and procedural content. Many teachers who spoke with the Review described some existing syllabuses as specifying too much material to be covered in too little time. A number of teachers told the Review that they 'race' from one piece of mandated content to the next, with the consequence that they are unable to teach in depth. Syllabuses that attempt to cover large amounts of material in limited time make it difficult for teachers to develop students' deep understandings of underlying concepts and principles.

The new curriculum is designed to address this challenge. It does this by reducing the amount of content teachers are expected to cover in some learning areas, and by focusing learning in every new syllabus on core knowledge, skills and understandings essential to further learning in that subject. This is not just a matter of deleting a percentage of content from an existing syllabus; it requires a reconsideration of what is central to each subject – the knowledge required to build further knowledge and the concepts and principles around which factual knowledge in the subject is organised. In the new curriculum, students develop this core content progressively over time.

Identifying and prioritising core learning

Core subject content can be identified in part from research findings. For example, studies of History have highlighted the importance of integrating historical knowledge (for example, knowledge of events, people, periods, changes); historical concepts (for example, continuity and change, cause and consequence, historical significance, empathy, contestability); and historical skills and methods. This suggests that core to subject History is the development of conceptual understanding and historical thinking and methods, and also historical knowledge. Deep understanding depends on knowing historical facts and having opportunities to apply understandings to specific historical contexts.

This interplay between factual knowledge and conceptual understanding is a feature of every subject. Deep understanding depends on mastery of a body of knowledge. Erickson et al describe this as the essential 'synergy' between knowledge/skills and concepts/principles (which they describe as the 'essential enduring ideas that students must understand at a deeper level').⁷¹ Specific subject knowledge substantiates and illustrates general concepts and principles, which in turn provide a way of organising and making sense of facts. As Erickson et al note, 'one cannot understand the conceptual level without the supporting factual knowledge'. The new NSW curriculum is intended to deliver this synergy by prioritising both factual knowledge and deep conceptual understanding.

⁷¹ LH Erickson, LA Lanning & R French, *Concept-based curriculum and instruction for the thinking classroom*, Corwin Teaching Essentials, Corwin, Thousand Oaks, California, 2007, p.3.

Whether particular content forms part of the core of a subject also is determined by how essential it is to learning across the school years. In general, core knowledge, skills and understandings do not appear in isolation or only once in the learning of a subject, but are important components of long-term development. Core facts are not introduced at one point in the curriculum and then not referred to again, but are essential prerequisites for further learning. Core skills are either skills essential to further skill development or skills developed progressively over time. And core concepts and principles are not limited to specific situations, but have general relevance to the learning of a subject across the years of school. They are revisited in increasing depth to develop students' understandings of how they can be applied in increasingly complex contexts.

Skills in applying knowledge

In the current school curriculum, the acquisition of skills is often treated differently from the acquisition of knowledge, and given a lower priority. This is particularly true in the later years of school where subjects are divided into academic subjects focused primarily on providing a knowledge base for further learning of a subject, and vocational subjects focused primarily on providing skills for particular occupations. But it is also reflected in approaches to general capabilities, which are often treated as conceptually different from, and less important than, disciplinary knowledge.

In many senior subjects, learning is focused primarily on knowledge and understanding required for post-school learning of the same subject. For students, there is a strong focus on examination preparation and knowledge recall, usually with few opportunities to apply subject learning in practical real-world settings.

In other subjects, learning is focused primarily on mastering and demonstrating skills, often in real or simulated workplace settings. These skills usually have been identified as necessary for particular occupations and may be specified in industry frameworks. For students, there is a strong focus on the practical mastery and demonstration of skills, with less direct emphasis on theoretical understanding.

Not only is there a bifurcation of learning during these years, but from the perspective of most students, parents and teachers, academic learning is seen as preferable to vocational learning. Learning to acquire knowledge is seen as more desirable than learning to acquire skills.

At the same time, more emphasis has been given in recent years to skills referred to as 'general capabilities', 'generic skills' or '21st century skills'. These skills tend to be identified separately from the content of subjects, usually with the intention that teachers will 'embed' them in subject teaching. Attempts sometimes are made to teach and assess such skills independently of subject content. For example, critical and creative thinking may be taught and assessed as standalone capabilities.

General capabilities of these kinds include 'literacy' and 'numeracy' which also are conceptualised as standalone skills to be developed across all school subjects. Literacy includes skills in reading, writing, spelling and applying language conventions. Numeracy is defined as the ability to apply mathematical knowledge and skills to practical situations and problems.

To the extent that the school curriculum separates skills from knowledge and application from theory, student learning suffers. Currently, some syllabuses place too little emphasis on the practical application of knowledge; others place too little emphasis on theoretical knowledge and understanding. Advocates of general capabilities often undervalue the importance of disciplinary knowledge; advocates of existing academic subjects often undervalue the importance of skills in applying disciplinary knowledge.

The new curriculum is designed to address these challenges. It does this by adopting a more integrated approach to knowledge and skills in every school subject. Every learning area in the new curriculum is focused not only on building knowledge and understanding, but also on developing students' abilities to apply what they learn. The ability to apply subject knowledge is seen as an integral part of increasing proficiency in every subject, both during the early and middle years of school and during the later years. In practice this means new syllabuses are designed not only to develop increasing knowledge and understanding, but also to develop skills in knowledge application.

For some existing academic subjects in the later years of school this means providing students with better information and more examples of where and how subject content can be applied. For some existing vocational subjects, it means a greater focus on developing students' underpinning knowledge and understandings. The new curriculum also requires every student in the senior years to undertake a major investigative project in a subject of their choosing. The purpose of this project is to provide a context in which students can further develop their subject knowledge as well as developing and demonstrating skills in knowledge application, including skills in using relevant technologies, sourcing and analysing information, critical and creative thinking, collaborating, and communicating.

As noted earlier, there is evidence that a large and growing percentage of NSW students complete the middle years of school unable to apply what they have learnt in reading, mathematics and science to new and unseen situations and problems. The new curriculum is designed to address this challenge by providing opportunities for students to see how learning can be applied and to develop skills in knowledge application in every mandated subject. New syllabuses envisage teachers spending more time developing students' understandings of essential concepts and principles, including by demonstrating their application in a range of settings, and students spending more time applying what they are learning to tasks they are set, problems to be solved, practical challenges or projects. This requires time and, in some subjects, a shift in priorities.

General capabilities including literacy and numeracy

The new curriculum also adopts a more integrated approach to general capabilities, including literacy and numeracy. These are viewed as skills in applying knowledge and are developed and demonstrated as part of subject learning. Rather than being assessed separately, they form part of the assessment of students' levels of attainment in relevant subjects.

For example, rather than seeing 'numeracy' as a separate skill, the ability to apply mathematics is considered an essential part of subject mathematics and is assessed accordingly, not separately through standalone numeracy tests. In the new curriculum, the main purpose of assessment is to establish the points individuals have reached in their long-term progress so that they can be provided with well-targeted teaching to promote further growth. In mathematics, assessments are made against the new syllabuses of the mathematics curriculum and so directly inform mathematics teaching and learning. In contrast, most 'numeracy' assessments indicate skill levels but are not designed to indicate the points students have reached in a curriculum.

Similarly, existing 'literacy' assessments indicate skill levels but generally do not provide information about the points students have reached in a curriculum. In the new NSW curriculum, the subject English includes, but is not limited to, curricula for the long-term development of skills in reading, writing, speaking and listening. New syllabuses in English include descriptions and illustrations of the development of these skills, and assessments indicate the levels individuals have reached and guide next steps in teaching and learning.

From this perspective it can be seen that NAPLAN is an assessment of skill levels rather than an assessment of the points individuals have reached in their progress through a curriculum. As such, it is not clearly aligned with the new curriculum's approach to assessing student learning.

Excellent ongoing progress

The curriculum in every subject is designed to build increasingly sophisticated knowledge, deeper understandings, and higher levels of skill in an area of learning over multiple years of school. In most subjects, learning is a long-term, continuous and cumulative process that may begin prior to school and continue beyond the school years. Students make progress in a subject across the years of school as new learning builds on prior learning and lays the foundations for further learning.

In practice, learning at school occurs through a sequence of syllabuses. Currently, each syllabus spells out what teachers are expected to teach and students are expected to learn in some specified period of time at a particular stage in the schooling process.

This intention is illustrated in Figure 12, which shows a sample scope and sequence chart for the teaching of mathematics in Year 6.⁷² The chart summarises what is to be taught and the sequence in which it is to be taught. The outcomes to be taught and learnt in each term of Year 6 are identified, along with the number of lessons per week to be dedicated to each strand/sub-strand of mathematics in that term. Through scope and sequence charts of this kind, teachers are encouraged to address particular topics at particular times and for specified lengths of time.

Mathematics sample Stage 3 scope and sequence – Year 6 (illustrating the completion of Stage 3 by the end of Year 6)

Term 1	Strands/ Substrands	Number and Algebra 1: (3 to 4 lessons per week) Focus: Whole Numbers, Addition and Subtraction, Multiplication and Division, Fractions, Decimals and Percentages, Patterns and Algebra
		Measurement and Geometry 1: (1 to 2 lessons per week) Focus: Length, Mass, Time, Position
	Outcomes	Number and Algebra 1: MA3-1WM, MA3-2WM, MA3-3WM, MA3-4NA, MA3-5NA, MA3-6NA, MA3-7NA, MA3-8NA Measurement and Geometry 1: MA3-1WM, MA3-2WM, MA3-3WM, MA3-9MG, MA3-12MG, MA3-13MG, MA3-17MG
Term 2	Strands/ Substrands	Number and Algebra 2: (3 lessons per week) Focus: Addition and Subtraction, Multiplication and Division, Fractions, Decimals and Percentages
		Measurement and Geometry 2: (1 lesson per week) Focus: Area, Two-Dimensional Space, Angles Statistics and Probability 1: (1 lesson per week) Focus: Chance
	Outcomes	Number and Algebra 2: MA3-1WM, MA3-2WM, MA3-3WM, MA3-5NA, MA3-6NA, MA3-7NA Measurement and Geometry 2: MA3-1WM, MA3-2WM, MA3-3WM, MA3-10MG, MA3-15MG, MA3-16MG Statistics and Probability 1: MA3-1WM, MA3-2WM, MA3-3WM, MA3-19SP
Term 3	Strands/ Substrands	Number and Algebra 3: (3 to 4 lessons per week) Focus: Addition and Subtraction, Multiplication and Division, Fractions, Decimals and Percentages, Patterns and Algebra
		Measurement and Geometry 3: (1 to 2 lessons per week) Focus: Volume and Capacity, Three-Dimensional Space
	Outcomes	Number and Algebra 3: MA3-1WM, MA3-2WM, MA3-3WM, MA3-5NA, MA3-6NA, MA3-7NA, MA3-8NA Measurement and Geometry 3: MA3-1WM, MA3-2WM, MA3-3WM, MA3-11MG, MA3-14MG
Term 4	Strands/ Substrands	Number and Algebra 4: (2 to 3 lessons per week) Focus: Whole Numbers, Multiplication and Division, Fractions, Decimals and Percentages, Patterns and Algebra
		Measurement and Geometry 4: (1 to 2 lessons per week) Focus: Length, Area, Volume and Capacity, Mass, Time Statistics and Probability 2: (1 lesson per week) Focus: Data
	Outcomes	Number and Algebra 4: MA3-1WM, MA3-2WM, MA3-3WM, MA3-4NA, MA3-6NA, MA3-7NA, MA3-8NA Measurement and Geometry 4: MA3-1WM, MA3-2WM, MA3-3WM, MA3-9MG, MA3-10MG, MA3-11MG, MA3-12MG, MA3-13MG Statistics and Probability 2: MA3-1WM, MA3-3WM, MA3-18SP

Figure 12 Mathematics sample Stage 3 scope and sequence

Although syllabuses linked to time periods are ubiquitous in school education, they do not serve all students well. The reason is that, in most subjects, students differ in the points they have reached in their learning. In Australia, the most advanced 10 per cent of students in each year of school are typically five to six years ahead of the least advanced 10 per cent. This variability is present from the time children commence school and, in most subjects, is largely unchanged across the school years.

A consequence is that many students in each year of school currently are not learning effectively because they lack the prerequisites for the syllabus they are being taught. As they move from one school year to the next, they are required to move from one syllabus to the next – whether they are ready or not. These students often struggle, fall further behind each school year, and fail to meet even minimally acceptable standards of subject learning by the completion of the middle years.

⁷² NSW Education Standards Authority, Mathematics sample Stage 3 scope and sequence – Year 6 (illustrating the completion of Stage 3 by the end of Year 6), n.d., viewed 26 July 2019, <https://syllabus.nesa.nsw.edu.au/assets/global/files/maths_s3_samples3.pdf>.

Other students in each year of school are not learning effectively because they have already mastered most of the syllabus they are being taught. These students usually are unable to move to the next syllabus until the next school year, and so are under-challenged and do not achieve the higher levels of which they are capable.

The new curriculum is designed to address this challenge. It recognises that individuals learn best when teaching is targeted to their current levels of attainment and learning needs. In particular, it proposes that:

1. no student should be required to progress to the next syllabus until they have adequately mastered the content of the prior syllabus (as judged by their teacher); and
2. a student who has mastered the content of a syllabus (as judged by their teacher) should be able to progress to the next syllabus when ready.

In the new curriculum, some fundamental features remain the same. The curriculum in each subject consists of a sequence of syllabuses that spell out what teachers are expected to teach and students are expected to learn. Each syllabus builds on the content of prior syllabuses and lays the foundations for subsequent syllabuses. Together, these syllabuses provide a common path of learning designed to build students' knowledge, skills and understandings in a subject over multiple years of school.

The difference is that new syllabuses are not anchored to time. They simply define a sequence of increasing knowledge, skills and understandings in a subject. Another way to say this is that they are 'competence-based' rather than 'time-based'. Unlike existing syllabuses, they do not specify when all students must commence a syllabus and how long they all have to work on it before being required to move to the next. Students who require more time have it. Students who are ready to move to the next syllabus are able to do so.

New syllabuses are designed to give teachers and students more flexibility in teaching and learning — a need identified by many teachers who spoke with the Review. Teachers pointed out that existing syllabuses not only specify what they are to teach, when they are to teach, and how long they are to spend teaching particular content, but also assume every student in a year level is ready for the same syllabus content. New syllabuses provide teachers with a frame of reference for first establishing where individuals are in their learning and then ensuring every student is provided with appropriately targeted learning opportunities and challenges. Importantly, the intention is not to categorise or label students. Instead, at any given time, every student is taught material at an appropriate level of challenge for their current level of attainment.

In this way, the new curriculum gives students an appreciation of the progress they are making, both within a syllabus and from one syllabus to the next. Current approaches to assessing and reporting learning, which grade performances on the same year-level syllabus, give students little sense of the long-term progress they make in a subject. For example, students who receive low grades year after year often do not appreciate the absolute progress they are making. The new syllabuses provide a frame of reference for recognising and communicating every student's progress.

In summary, the new curriculum recognises that individuals learn more successfully when learning goals are clear and achievable on relatively short timelines; when these goals are at an appropriate level of stretch challenge and students are given regular feedback on what they need to do next; and when students have positive views of their ability to learn, encouraged by evidence of the long-term progress they are making.

Developing new syllabuses

An important practical consideration in the development of new syllabuses is the sequencing of subject content. This raises the question of what the curriculum in a subject is designed to develop over time. What is at the heart of the subject? What are the core understandings and skills students are expected to develop in increasing depth over an extended period of time? What is core knowledge? What are essential concepts and principles? Focusing on what is central to a subject inevitably introduces a long-term perspective on learning. Facts and procedures that are introduced only once in a curriculum and never referred to again are usually not foundations for further learning and may not be part of a subject's core.

A related question concerns the nature of development. What does it mean to become more proficient in a subject? What does increasingly deep understanding look like? How do students' understandings of important concepts and principles typically unfold over time? How do high levels of knowledge and skill in a subject differ from low levels of knowledge and skill? The construction of a meaningful sequence of new syllabuses in a subject depends on an understanding of how learning occurs in practice. This includes an understanding of logical sequences of content that build on prior learning and lay the foundations for subsequent learning, the role of prerequisites in learning success, and common pathways of student learning.

Research, both theoretical and empirical, can make a valuable contribution to the identification and sequencing of core subject content. In some school subjects there is now extensive research into how students learn specific content. For example, in science there is a large body of literature on students' developing understandings of scientific concepts. It is important that the sequencing of content in the new curriculum is grounded in evidence, rather than being determined by stakeholder interests or historical conventions for introducing content.

Another consideration in developing a sequence of new syllabuses in a subject is the number of syllabuses to be developed. Here, there is no correct answer, although there is an incorrect answer. The number of syllabuses should not correspond to the number of year levels. That would almost certainly lead to one syllabus being assumed appropriate for all students in the same year of school, thereby recreating time-bound syllabuses. The number of syllabuses also should not be a multiple of the number of years of school. For example, if there were twice as many syllabuses as years of school, that may lead to one syllabus being assumed appropriate for less advanced students in a particular year of school and the next syllabus being assumed appropriate for more advanced students in that year group. The number of new syllabuses should be chosen to avoid assumptions of this kind. The intention of the new curriculum is that teachers will establish the point each student has reached in their learning and ensure that they are working on a syllabus appropriate to that level of attainment.

The number of new syllabuses also should be chosen so that most students can achieve a syllabus on a realistically short timeline (months not years). It is important that learning goals are seen by students as challenging but achievable in the near term. Each new syllabus should represent a significant and meaningful amount of learning, distinguishable from prior and subsequent learning. And the number of syllabuses must be manageable by teachers who usually will have students working on more than one syllabus. Ideally, the chosen number of syllabuses will be the same for each subject.

A further practical consideration is the labelling or naming of syllabuses, given that they will not correspond to time periods. Labels of some kind are essential for ease of communication, but again, there is no single best solution. Whatever labels are chosen, they should clearly convey the order of syllabuses. Letters of the alphabet should be avoided because of the risk of association with current letter grades. Using numbers to label syllabuses is a possibility, although this may be seen by some as assigning 'scores' to students. And the use of words as labels is problematic given the likely number of syllabuses and the need to convey order.

A possible compromise is shown in Figure 13 where a combination of words and numbers is used to label a hypothetical sequence of 22 new syllabuses for use across 13 years of school. The new syllabuses are clustered into five groups (Beginning, Establishing, Emerging, Proficient, Advanced), and numbered within each group. Individual syllabuses thus have names like 'Beginning Level 3'.

	6
	5
Higher	4
	3
	2
	1
Proficient	4
	3
	2
	1
Emerging	4
	3
	2
	1
Establishing	4
	3
	2
	1
Beginning	4
	3
	2
	1

Figure 13 Possible labels for a sequence of 'new syllabuses'

Whatever system is used to label new syllabuses, it must be remembered that these labels apply to syllabuses, not to students. They are names for absolute levels of attainment through which every student progresses (much like 'Grade 3 Piano').

Assessing and communicating learning

Currently, every student is taught, assessed and graded on the same year-level syllabus. In other words, success in learning is defined as performance against what are essentially age-based expectations. Many students perform below these expectations year after year, receive consistently low grades as a result, conclude that they are poor learners, and eventually disengage from school. The true progress these students make over time is never revealed to them.

At the other extreme, more advanced students often begin each school year already on track to achieve high grades on year-level expectations. Some do this with relatively little effort and less year-on-year progress than many other students. At both ends of the spectrum, the current definition of success as performance on year-level expectations gives many students wrong messages about the relationship between effort and success.

Added to this, current A to E grades are poor communicators of students' levels of attainment in a subject and very poor communicators of their long-term progress. It is very difficult to interpret the meaning of a grade in terms of the point a student has reached in his or her learning. For example, a parent wishing to interpret a grade of D in Year 7 mathematics in terms of what their child now knows, understands and can do might do better to examine the content of the Year 5 or Year 6 syllabuses than the content of the Year 7 syllabus. And a student who achieves a D year after year might be excused for thinking they are making no progress at all.

The new curriculum is designed to address these challenges. It does this by providing superior ways to communicate both attainment and progress. A student's attainment is indicated by the highest syllabus they have achieved in a subject at any given time. This is the primary piece of information for reporting purposes. The standard (knowledge, skills and understandings) students must demonstrate to 'achieve' each syllabus is specified in the curriculum, and teachers decide when students have achieved it. A parent/carer wishing to know what it means for their child to achieve a particular syllabus only needs to examine the online descriptions and illustrations of that standard.

In addition, it is expected that teachers will provide ongoing feedback on students' learning within the syllabus they are being taught. This might include diagnosing specific difficulties individuals are experiencing or misunderstandings they have developed, and providing feedback on what a student still needs to master to achieve the syllabus on which they are working. The aim here is to prioritise learning rather than performance. Rather than grading a student's performance on a syllabus, information is provided about the progress the student is making toward achievement of that syllabus and the knowledge, skills or understandings they are yet to demonstrate.

In many subjects, digital assessment resources for each new syllabus will be helpful in assisting teachers in their assessment of student learning. These might include example activities and tasks, as well as samples of student performances and work that illustrate achievement of the syllabus. Judgements will depend on the expertise of individual teachers, but a level of consistency will be required in teachers' interpretations of syllabus standards. This will be especially important in the later years of school where some moderation of teachers' assessments may be desirable.

Information about the highest syllabus a student has achieved in a subject might be reported on the Higher School Certificate. For example, the highest syllabus a student achieves in Science might be reported on the certificate, even for students who choose not to continue their study of Science in the senior years.

Monitoring long-term progress

The new curriculum's sequence of new syllabuses also provides a superior basis for monitoring the long-term progress individuals make in a subject. The expectation should be that every student will make excellent progress every year, regardless of their starting point, and achieve at least a minimally acceptable level of proficiency by the time they leave school. This expectation is illustrated in Figure 14.

The vertical axis in Figure 14 shows the sequence of new syllabuses in a subject. As noted above, these are not defined to correspond directly to time periods. One syllabus (Proficient Level 4) is identified as the minimum standard every student should reach (and ideally surpass) by the time they leave school. Most students might reach this standard by the end of Year 10, and some by the end of Year 9. The horizontal axis introduces time (years of school). The shaded 'on track' region indicates the path a student must follow, at a minimum, to achieve this standard by the end of Year 12. The hypothetical trajectory of one student is shown here. This student began school performing below expectation in this subject but made strong progress and achieved the proficient standard in Year 11.

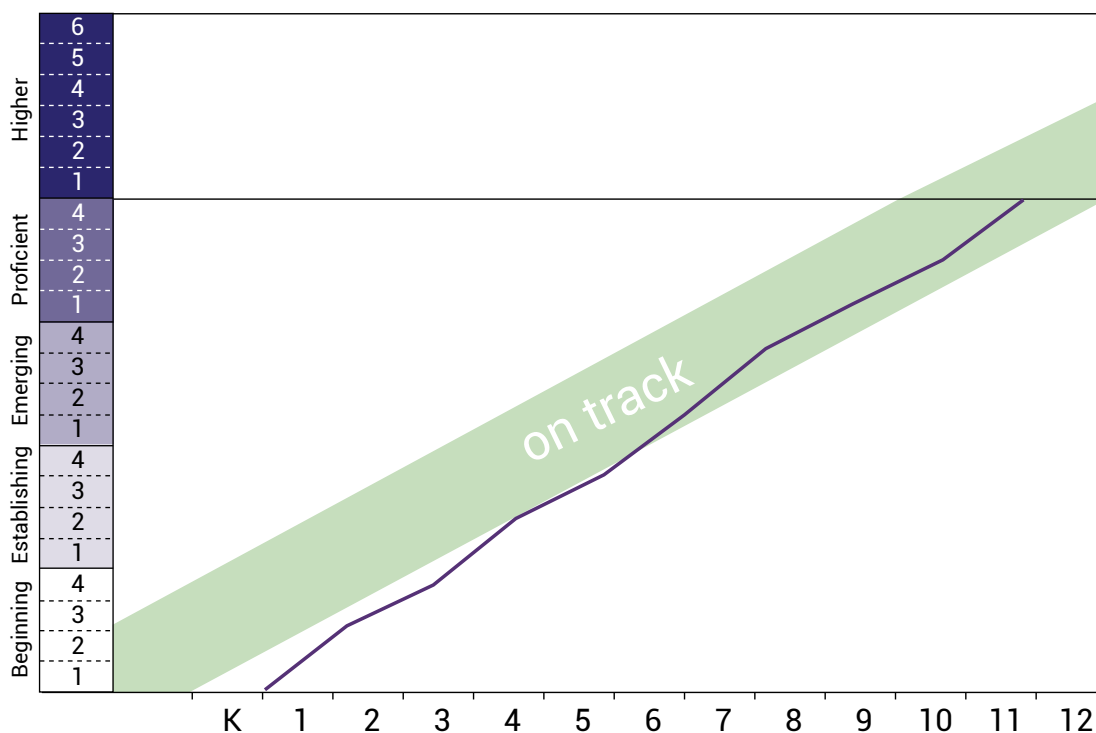


Figure 14 Framework for monitoring long-term learning progress

Figure 14 provides teachers and schools with a basis for monitoring long-term progress in a subject and for evaluating whether a student is making adequate progress in their learning. Students who are not on track may require special support and intervention to get them on track as quickly as possible. This is especially important in the early years; some children currently begin school on trajectories that do not see them reach minimally acceptable standards by the time they leave school. And for some children there may be a need for ongoing support to keep them on track.

The 'on-track' diagram also could be used in reporting to parents/carers. As well as identifying the highest syllabus a student has achieved at any given time, and providing details about their progress toward the achievement of the next, teachers could share with parents/carers information about an individual's long-term trajectory of learning, as shown here.

Ideally, once students have achieved the minimum proficiency standard in a subject (that is, Proficient Level 4), they would be able to embark on syllabuses at the 'Higher' level as part of the Higher School Certificate. For example, once students have achieved Proficient Level 4 in mathematics, ideally they could commence the study of HSC mathematics. For some students, this may occur in Year 10 or, in exceptional cases, Year 9 or earlier. Achievement of the minimum proficiency standard in mathematics might also be expected of students wishing to commence other HSC subjects such as Financial Services. Students' abilities to commence HSC studies at differing times will depend on schools' abilities to accommodate this. However, a growing number of schools are introducing flexibility in when students can commence HSC subjects and, in future, the wider use of online and personalised learning is likely to provide still greater flexibility.

In specific areas of learning – perhaps reading, writing and mathematics – students who have not met the Proficient standard by the end of Year 10 may be required to continue study in those areas until they do. This is not to say that they would necessarily undertake an HSC subject in the area, but that they would continue learning (possibly online or as part of a vocationally oriented program) until they achieved the standard. It is also not assumed that failure to meet the Proficient standard in a subject by the end of Year 10 would preclude a student from commencing syllabuses at the Higher level, although there may be need for bridging support to enable them to achieve the Proficient standard so that they can engage effectively in those syllabuses.

Progress in HSC subjects

In the new curriculum, the concept of progressive attainment in a subject applies to the entire school curriculum, from Kindergarten to Year 12, including each HSC subject. Figures 13 and 14 suggest a sequence of six learning modules (all labelled 'Higher') in each HSC subject.

It is envisaged that, to the extent possible, each learning module will build on prior modules in the sequence, with teachers assessing and recording the 'achievement' of each module. Taking science as an example, every student first studies science for most of their schooling with the objective of demonstrating at least a minimally acceptable level of attainment (Proficient Level 4). They may then choose to discontinue their study of science or to study one or more specialist branches of science such as HSC chemistry or HSC biology, each of which consists of six sequenced learning modules.

The intention is to see learning in the senior years, too, as a process through which students develop progressively more sophisticated knowledge, deeper understandings and higher levels of skill over time. Learning modules are designed to promote and recognise this progress, rather than all teaching and learning in these years being focused entirely on preparing students for a final examination.

An important advantage of this structure is that it introduces greater flexibility for students. Some students may choose to complete all six modules in a subject, but others may choose to complete fewer. The modules a student achieves might be recognised through school-based 'micro-credentials' and reported on the student's Higher School Certificate. The modularisation of learning in this way introduces the possibility of students assembling programs of study better tailored to their individual interests and learning aspirations.

If students are able to commence an HSC subject when they are ready – that is, once they have achieved the Proficient standard and wish to commence work on syllabuses at the Higher level – some students may achieve one or more modules of an HSC subject by the end of Year 10. At the other extreme, the most advanced module in a subject might consist of content usually found in post-school courses, in which case post-school institutions may be prepared to recognise that module as contributing to a higher education or vocational qualification. In these ways, adopting a common curriculum structure across all subjects and all years of school promotes continuity and flexibility of learning and blurs current distinctions between academic and vocational learning and phases/stages of learning.

Each HSC subject in the new curriculum requires a combination of teacher assessment and external assessment. Teacher assessments relate to the six learning modules in the subject. Teachers decide whether a student has 'achieved' each module and monitor progress toward achievement of the next. Criteria for the achievement of each module, assessment resources and work samples assist teachers to make these decisions. Teachers' assessments, which may include judgements of students' overall performances in a subject, provide the school-based component of students' HSC results.

In some subjects, the external assessment takes the form of a written examination of the entire subject toward the end of Year 12, as at present. In other subjects, external assessments take other forms, including supervised online assessments and external evaluations of students' performances or work. For example, in some subjects, rather than sitting a final examination, students sit a supervised, externally developed online assessment of the content of each learning module – ideally, when they feel ready to demonstrate mastery of that content.

8. IMPLEMENTING THE NEW CURRICULUM

The Review is recommending a significant redesign of the NSW school curriculum. The recommended changes have been developed to support teachers to ensure every student learns successfully and is well prepared for further learning, life and work and to lift overall levels of performance in NSW schools. The new curriculum arrangements may require a decade to implement fully. Implementation involves four major activities: (1) developing a suite of new syllabuses; (2) introducing a number of new curriculum features in each phase of school; (3) engaging and collaborating with stakeholders; and (4) creating enabling conditions, including the capacity in schools to implement new curriculum arrangements. This section provides recommendations for each.

The implementation of the new curriculum will require careful planning and adequate resourcing. It will not be possible or desirable to commence work on all aspects of the curriculum reforms simultaneously. A logical sequencing of work that includes in some cases further consultations with teachers and schools and the investigation and testing of options will be required. Nevertheless, work in some areas, particularly on the design of new syllabuses to address concerns about overcrowding and lack of flexibility to meet individual student needs, should be begun as soon as possible.

New syllabuses

The major task in introducing the new curriculum is the design and development of a suite of 'new syllabuses'. This should be done in a phased way for mandated subjects, beginning with English and Mathematics, then Science and Human Society and its Environment, followed by other subjects of the mandated curriculum. Parallel work should be done to design new senior secondary syllabuses, again adopting a phased approach. It is envisaged that the development of all new syllabuses could take a decade.

Learning with understanding

In every subject, the development of new syllabuses involves the same set of steps. The first set of steps relates to the identification of core content and the removal of less essential content where that is judged desirable.

An exercise should be undertaken to decide on the core content of the subject. The aim here is to identify essential factual knowledge, skills, concepts and principles, the understanding of which is developed in increasing depth across the years of school. Ideally, this exercise will identify a relatively small number of essential ideas or understandings that underpin learning in the subject and around which specific factual and procedural knowledge is organised. This is an important step in deciding what is core to a subject and in identifying content that is more peripheral and could be removed in subjects where some reduction in content is judged necessary.

It is envisaged that, in many subjects, there will be a reduction in the total volume of factual material teachers are expected to teach and students are expected to memorise, making more time to develop deep understandings of content. Each subject has a body of knowledge and skills that every student must master, but the new curriculum prioritises learning with understanding. In practice, this means each subject provides teachers with more time to teach important ideas in depth, including by illustrating how core concepts and principles can be applied in a variety of settings and by providing students with more opportunities to apply what they are learning.

The sequencing of core content through new syllabuses should be informed by theoretical and empirical research into how increasingly deep knowledge and understandings in a subject commonly unfold and are best developed over time.

Quality teaching resources will be required to assist teachers to teach important ideas in depth. These resources should provide multiple instances and applications of the core content of a subject, as well as activities that students could undertake to develop deeper understandings of this content. In many subjects, teachers should be given more flexibility to decide how students' understandings are best developed, made possible by a reduction in the amount of content they are expected to cover. Professional learning activities that assist teachers to teach core content in depth also are likely to be valuable, at least for some teachers.

Design new syllabuses for each subject, including subjects of the senior years, to reduce the volume of mandated content where appropriate and to prioritise the learning of core facts, concepts and principles.

- In each subject of the new curriculum, identify essential facts, concepts and principles, the understanding of which is developed in increasing depth over time, and where required, use this to identify content that is more peripheral and could be removed.
- Decide how this core content is to be sequenced through new syllabuses, informed by evidence of how increasingly deep knowledge and understandings in a subject commonly unfold and are best developed over time.

Skills in applying knowledge

Second, explicit attention should be given in the syllabuses of each subject to the development of students' skills in knowledge application. These skills include gathering and analysing information, thinking critically and creatively, using technologies, collaborating with others, and communicating. Such skills should be identified as part of the intended learning in each subject and new syllabuses for the subject should make explicit how these skills are to be developed across the years of school.

Teaching resources developed for each subject also should provide support to the teaching and development of these skills. These resources should include examples of student activities that provide contexts for the development and demonstration of skills in applying core subject knowledge and understandings. Activities might include problems to be solved, practical applications or small-scale projects on which students work.

Design new syllabuses not only to develop increasingly sophisticated knowledge and deeper understandings of a subject, but also skills in applying that knowledge.

- Make explicit in new syllabuses for every subject that skills in applying knowledge are part of the intended learning, and show how these skills are to be developed over time. These skills include subject-specific skills, but also skills in using technologies, sourcing and analysing information, critical and creative thinking, collaborating, and communicating.

Excellent ongoing progress

The third set of steps relates to the sequencing and structuring of learning in each subject. Considerations of content and structure in curriculum design are often referred to as 'scope and sequence'. Although these considerations are presented here as separate aspects of the design process, they should be addressed concurrently. Any consideration of content inevitably entails a consideration of how knowledge, skills and understandings are to be sequenced and developed in a subject over an extended period of time.

Consideration should be given to how core knowledge and understandings in the subject are to be developed across the years of school. This requires an understanding of how essential factual knowledge builds over time and how increasingly deep understandings of core concepts and principles are typically developed over time. To the extent possible, the sequencing of content in new syllabuses should be informed by theoretical and empirical evidence of how learning in a subject occurs in practice, taking into account prerequisites for learning, logical sequences for the introduction of content, common paths of learning, and evidence of what students find easier and more difficult in practice. The outcome of this work will be an evidence-based plan for the sequencing of subject content.

Then, a sequence of new syllabuses should be constructed for the subject. These replace, but are similar to, existing syllabuses in a subject. Each new syllabus spells out what teachers are expected to teach and students are expected to learn. As noted above, the intention is that, in most subjects, the amount of content specified in new syllabuses will be less than the content specified in current syllabuses. Each new syllabus will prioritise deep learning of important facts and ideas in the subject and give teachers greater flexibility to do this. Each will build on the content of prior syllabuses and lay the foundations for subsequent syllabuses. Together, the sequence of new syllabuses will define a common path of learning for every student.

The development of each new syllabus in a subject requires decisions about the knowledge, skills and understandings to be developed within that syllabus as part of the larger sequence of learning in the subject. In general, these will be knowledge, skills and understandings required for the next syllabus in the sequence, and upon which that syllabus builds. In this sense, new syllabuses provide a sequence or progression of learning in the subject.

Importantly, new syllabuses differ from existing syllabuses in that they are not tied to particular stages or year levels but instead define absolute levels of proficiency or attainment in a subject. The task in developing the content of each new syllabus is to ensure a meaningful sequence of learning, not to develop a syllabus for every student in a particular year group. The envisaged new syllabuses will be smaller units of learning than existing year-level syllabuses, and in each subject, there will be a larger number of them than currently. The exact number will be determined by NESAs.

The redesign of the curriculum for the later years of school also involves the development of new syllabuses which give greater priority to learning with understanding and to developing students' skills in applying knowledge. In practice, each subject during these years is divided into a set of learning 'modules', each of which builds on prior modules in that subject. The curriculum development task is to decide, subject by subject, how new syllabuses could be presented as a sequence of (perhaps six) learning modules. The intention is that each module, while part of a sequence of learning, also could be taught and assessed as a unit of learning, thereby providing greater flexibility in when learning occurs and how many modules individuals choose to complete.

For each new syllabus in a subject, clarity is required about what students should know, understand and be able to do by the completion of that syllabus. In other words, there must be clarity about the standard students are expected to reach. This standard should be described and illustrated with samples of student responses and work that meet the standard. Students meeting this standard are considered to have 'achieved' the syllabus and to be ready for the more challenging work of the next syllabus in that subject. Classroom teachers decide when students have achieved a syllabus and are ready for the next. Material illustrating achievement of the syllabus should be available to teachers online. In the case of subjects in the later years of school, some form of moderation of teachers' judgements also may be desirable.

Design new syllabuses that do not specify when every student must commence, or how long they have to learn, the content of each syllabus.

- Make new syllabuses untimed, with students progressing to the next syllabus once they have mastered the prior syllabus. Students who require more time should have it; students ready to advance should be able to do so.
- Specify what students are expected to know, understand and be able to do as a result of being taught each syllabus in a subject and illustrate this standard with samples of student responses and work.

Building strong foundations

The primary objective of the new curriculum is to provide every student, in each phase of learning, with strong foundations for what comes next. The ultimate aim is to ensure every student leaves school well prepared for a lifetime of ongoing learning and informed and active citizenship and with knowledge, skills and attributes that will help equip them for meaningful work and satisfying careers. Underpinning this objective is recognition that there are currently significant costs to individuals and society when students fall behind in their learning and leave school with inadequate levels of attainment.

As well as introducing new syllabuses for every subject to give greater priority to learning with understanding, building skills in applying knowledge, and ensuring every student makes excellent ongoing progress in their learning, the new curriculum establishes a number of priorities for teaching and learning in each phase of school.

The early years

The priority in the early years of school should be to redesign the curriculum to support teachers to ensure every child establishes solid foundations in the basics, especially oral language development, early reading and writing skills and early mathematics knowledge and skills. There are several aspects to the redesign.

The first is simply to make explicit in the school curriculum that these skills have top priority in the early years and take precedence over other areas of learning and development, particularly for children who are less advanced in these skills. The curriculum should make clear that more time is to be devoted to these skills for children who need it.

Second, a more detailed and explicit curriculum in reading should be developed as part of the subject English. This curriculum should be grounded in research into how young children learn to read.⁷³ It should make clear steps in learning to read, including the role of foundational oral language and pre-reading skills. The curriculum should be designed to recognise that children in the early years of school are at very different points in learning to read. Some children commence school already reading at relatively advanced levels; others are at much earlier stages of development and lack essential foundational understandings and skills. The reading curriculum should be based on an explicit continuum of reading development and structured to support early years teachers to establish the levels individuals have reached in their reading, diagnose and remediate skill deficits, decide best next steps in a child's learning to read, and monitor individual reading progress over time. Described and illustrated levels of reading development should be extended through the primary years and beyond to support the ongoing teaching of reading. The goal should be to ensure that every student is provided with well-targeted teaching to promote continual progress in their reading development.

Third, a similar approach should be taken to early mathematics learning. Children also begin school at very different stages in their learning of mathematics. Some are relatively advanced, but others lack foundational concepts necessary for learning mathematics at school. The mathematics curriculum should be structured to assist teachers to establish the different points children have reached in their mathematical knowledge and understanding so every child can be provided with well-targeted teaching and challenging learning opportunities appropriate to their current levels of attainment. The mathematics curriculum, too, should be based on an explicit continuum of mathematics development and structured to support teachers to diagnose and remediate conceptual gaps and skill deficits, decide best next steps in each child's mathematics learning, and monitor individual progress over time. The goal should be to ensure every student is provided with well-targeted teaching to promote ongoing progress in their mathematics learning.

⁷³ For example, see Castles, A, Rastle, K & Nation, K 2018, 'Ending the reading wars: reading acquisition from novice to expert'.

In the early years of school, give priority to providing every child with solid foundations in the basics, especially oral language development, early reading and writing skills and early mathematics knowledge and skills.

- Make explicit in the curriculum that oral language development, early reading and writing skills and early mathematics skills are top priorities in the early years of school, particularly for children who are less advanced in these areas, and that these take precedence over other aspects of learning.
- Develop a detailed and explicit curriculum for the teaching of reading as part of new syllabuses for subject English, structured to assist teachers to establish and diagnose where individual children are in their reading development, and accompanied by evidence-based teaching advice.
- Structure the early mathematics curriculum to support teachers to establish the points children have reached in their mathematics learning, including by diagnosing conceptual gaps and skills deficits, and provide accompanying evidence-based teaching advice as part of new syllabuses in mathematics.

The middle years

The priority in the middle years should be to ensure that, in studying a set of mandated subjects, every student is provided with challenging learning material appropriate to their current level of attainment, has the time they require to master that material, and achieves at least a minimally acceptable standard in each of these subjects by the completion of their schooling. The goal should be to reduce the number of students failing to achieve adequate levels of learning in mandated subjects and to ensure every student builds solid foundations by the completion of the middle years. There are several aspects to the redesign.

First, the existing set of mandated learning areas and subjects should be maintained – with two additional requirements. Every student should commence learning a second language during the primary years, with a priority being given to languages of the region, including Mandarin and Indonesian. Every student also should achieve a specified level of understanding of Aboriginal cultures and histories, developed through a curriculum that forms part of Human Society and its Environment.

Second, a sequence of 'new syllabuses' should be developed for each mandated subject. Each new syllabus should promote learning with understanding by prioritising deep learning of core concepts and principles in the subject, as well as building students' skills in applying subject knowledge. Each syllabus should be designed to build on the content of prior syllabuses and provide the foundations for subsequent syllabuses.

Third, the curriculum should make clear that progression from one syllabus to the next depends on demonstrated mastery of the prior syllabus content. The standard students are expected to reach (that is, what they are expected to know, understand and be able to do) as a result of each new syllabus should be made clear. Students who require more time should be given more time; students who are ready to move to the next syllabus should be able to do so. A consequence, particularly in some subjects, may be that not all students in a class will be taught the same syllabus at the same time.

Fourth, in each mandated subject, the minimum level of attainment expected of every student by the time they complete school should be specified. This standard will make explicit what every student should know, understand and be able to do, at a minimum, as a result of studying that subject for up to ten or eleven years of school. There is no proficiency standard of this kind currently.⁷⁴ The curriculum development task is to establish this standard in each subject, which in Figure 14 corresponds to the standard required to achieve Proficient Level 4.

Fifth, teachers and schools should be supported to monitor students' trajectories of attainment in each mandated subject across the years of school with a view to establishing whether they are on track to achieve the identified minimum standard by the completion of school. The intention is to provide schools with an improved basis for identifying students who are not on track so that appropriate action can be taken.

⁷⁴ There are standards of literacy and numeracy students are expected to demonstrate, but there are not standards in mandated school subjects.

In the middle years of school, give priority to providing every student with challenging learning material appropriate to their current level of attainment in the expectation that they meet (and ideally exceed) a minimally acceptable standard in each mandated subject by the completion of school.

- Maintain the existing set of mandated subjects; for each subject define the minimum level of attainment every student should achieve by the completion of school; and provide teachers and parents/carers with a way of monitoring whether individuals are on track to achieve that standard.
- Require every student to commence learning a second language during their primary years, making use of technology where possible.
- Develop a curriculum that specifies what every student should know and understand about Aboriginal cultures and histories, and incorporate this curriculum into Human Society and its Environment.

The later years

The priority in the later years of school should be to provide every student with opportunities to pursue personal interests and strengths through rigorous, specialised HSC subjects, each of which builds solid theoretical foundations, provides opportunities to transfer and apply knowledge, and develops skills in the practical implementation of subject learning. This vision for learning in the later years will require considerable reform of existing arrangements and considerable time to implement. A newly developed set of HSC subjects is envisaged, smaller in number and eliminating the current academic-vocational dichotomy. There are several aspects to the redesign.

First, a commitment should be made to eliminate the current bifurcation of learning in the later years of school based on distinctions between knowledge and skills, theory and practice, and academic and vocational learning. The long-term commitment should be to the development of a set of HSC subjects, each of which involves rigorous, high-quality learning that integrates knowledge and the practical application of knowledge in a particular area of learning. The implication is that no subject should be designed solely to provide the knowledge base required for further study of that subject at university, and no subject should be designed solely to develop a set of practical skills required for a particular occupation. Every HSC subject should involve advanced, integrated learning.

Second, consistent with the elimination of the current academic-vocational dichotomy, a new framework for learning in the senior years should be developed and adopted. This framework should consist of a set of new 'learning areas' designed to support student pathways. Figure 15 provides a possible starting point. Each learning area should be promoted as a focal point for schools' relationships with relevant industries and post-school providers, as well as playing a role in developing students' understandings of career opportunities, courses and pathways and more general developments in that field. An objective should be that all future subjects in a learning area are equally rigorous, valued and supported. A first step is to assign every existing subject in the senior years to one of these new learning areas.

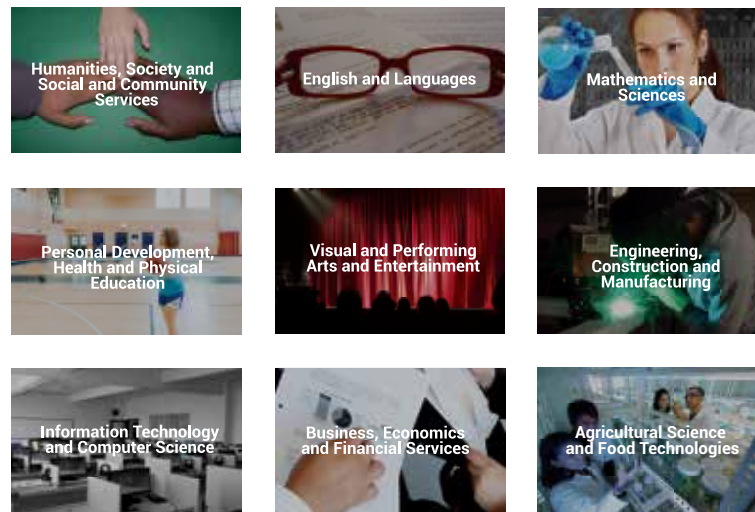


Figure 15 A new framework for learning in the senior years of school

Third, work should be commenced within each of the new learning areas on the development of a future set of HSC subjects. This work should begin by exploring the feasibility of reducing the total number of available subjects, including by combining and consolidating subjects. The result of this exploration should be agreement on a future set of HSC subjects for the learning area, each of which involves rigorous, integrated, high-quality learning. Work should then be commenced on the development of these subjects. Some new subjects may be based on existing general/academic subjects, often with greater emphasis on knowledge application and skill development. Some may be based on existing vocational subjects, often with greater emphasis on underpinning theory and the explicit development of knowledge and understanding. Still other subjects may be entirely new.

Fourth, a requirement should be introduced for every student to undertake a major investigative project in the final years of school in a subject of their choosing. The purpose of this project is to provide a context in which every student can apply their subject learning to a meaningful situation or problem and also develop and demonstrate skills in knowledge application. Each project should be completed by an individual student in a specified subject, although some projects, by their nature, may draw on learning in more than one subject and/or require a level of collaboration with others. Common specifications should be developed for the project, including criteria to guide student work and teachers' assessments. Every project should require problem solving that includes information gathering and analysis, appropriate uses of technology, critical and creative thinking, and the communication of outcomes. Assessed performances on the major project should form part of students' HSC results, with moderation to ensure adequate consistency of teacher judgements across teachers, subjects and schools.

Consideration should be given to ways of creating time for the major project within the senior curriculum. The project is envisaged as a major investigative work that would not easily be incorporated within individual subjects. Some subjects already include major works called 'projects', but these are not always investigative projects of the kind envisaged. It is recommended that a defined percentage of available time in the final years be allocated to the major project, alongside the study of HSC subjects.

Fifth, a taskforce should be established, comprising representatives of the higher education sector, the school sector and the Universities Admissions Centre, to investigate the feasibility of not calculating and reporting the Australian Tertiary Admission Rank (ATAR). The problem to be addressed is the way ATAR dominates student, parent and teacher thinking in the later years of school and overshadows the HSC as the primary measure of 13 years of learning. The intention is not to change the information available to universities or to alter the outcomes of current applicant ranking processes. Rather, the purpose is to explore the possibility of bypassing the calculation and reporting of ATAR by inputting students' scaled HSC scores directly into the calculation of course selection ranks. The taskforce should explore the feasibility of replacing a student's ATAR with information about the number of places available in each course to which they applied and their current ranking for that course (for example, 56 places available and currently ranked 63rd), enabling them to change preferences if they wish, as at present.

In the later years of school, give priority to providing every student with opportunities to pursue personal interests and strengths through rigorous, specialised subjects, each of which builds solid theoretical foundations, provides opportunities to transfer and apply knowledge, and develops skills in the practical application of subject learning.

- Eliminate the current bifurcation of learning in the later years by developing over time a new set of HSC subjects, each of which involves rigorous, high-quality learning that integrates knowledge and the practical application of knowledge.
- Replace the existing learning areas in the later years with a newly defined set, allocate all future HSC subjects to these areas and promote them as focal points for schools' connections with relevant industries and post-school providers and pathway and career advice.
- Require every student to undertake a major investigative project in a subject of their choosing, with common assessment criteria, moderation of teacher assessments, and performances forming part of a student's HSC results.
- Establish a taskforce comprising representatives of the higher education sector, the school sector and the Universities Admissions Centre, to investigate the feasibility of not calculating and reporting the Australian Tertiary Admission Rank (ATAR).

Stakeholder engagement

The implementation of the new curriculum will need to occur over a number of years to allow new features of the curriculum to be designed, developed and piloted in schools. Stakeholder groups, particularly teachers, should be closely involved in all phases of implementation. This will be important to ensure new arrangements are introduced in ways that best support the work of teachers and schools, as well as achieve their broader educational purposes. The new curriculum should be developed collaboratively and 'owned' by the widest possible range of NSW stakeholders.

Communicating the case for change

It will be essential that those leading the implementation of the new curriculum communicate clearly the key intentions, guiding principles and underpinning evidence base for the new curriculum. This includes explaining the urgency of change. Currently, a large and growing proportion of NSW students leave school with unacceptably low levels of attainment, including in areas such as reading and mathematics. These students usually have performed below expectations throughout their schooling. Many have fallen increasingly far behind as year-level syllabuses have moved increasingly far ahead of them. At the same time, the low-skill occupations these students might once have entered are rapidly being replaced by machines or lost to low-wage economies and, as technology advances, the range of jobs capable of being performed by machines will expand. If students are to find meaningful employment, avoid long-term economic disadvantage, and become active and engaged adult members of society, then every student will require levels of knowledge and skill currently achieved by only some. As many other developed countries are recognising, this is an urgent challenge with far-reaching implications, including for social cohesion.

Adding to the challenge is the fact that many existing NSW syllabuses contain significant amounts of factual and procedural content that teachers feel compelled to cover. Teachers describe feeling under time pressure to teach the extensive content of many syllabuses. The consequences for students are that teaching and learning can be focused on coverage rather than deep understanding. Overcrowded syllabuses erode teachers' time to work with students who are slipping behind in their learning and to challenge and extend more advanced students. And there is often limited time for teachers to explain the relevance and practical application of what they are teaching or for students to build deeper understandings by transferring and applying their learning to different contexts. When teachers are focused on covering large numbers of 'dot points' in syllabuses, there is also less opportunity to develop broader capabilities and attributes students are likely to require for future life and work.

In the senior years, the school curriculum continues to be determined by the needs of particular post-school destinations. It is bifurcated into an 'academic' stream focused on forms of learning that can be assessed by external examination and that provide a basis for university selection, and a 'vocational' stream focused on skills for specific occupations. This separation of knowledge-for-university and skills-for-work encourages a view of vocational learning as a relatively low-status activity – despite the aspiration of almost all students to pursue successful pathways to future careers. There is an urgent need to broaden the nature of learning in the senior years of school to better prepare all students with knowledge, skills and attributes that will equip them for further learning, life and work.

The Review's proposed reforms are responses to these and other concerns. They require significant change to the content and structure of the school curriculum and so cannot be implemented as minor modifications to the existing curriculum or as complementary additions. And because they involve deep change, they can be implemented only with planning and testing over an extended period of time.

For those implementing the new curriculum it will be equally important to communicate what is not intended. Although feedback on the Review's Interim Report provided strong support for its proposed reform directions, it was often made clear that this support was contingent on how the Review's intentions were implemented in practice. Some specific questions raised in submissions are addressed below.

Questions about the content of the new curriculum

There was almost universal agreement on the need to reduce the amount of content in the current curriculum, including by reducing the volume of material in some syllabuses and by minimising the number of 'extra-curricular' issues schools have been asked to address in recent years. However, at the same time, there was concern about how decisions would be made to reduce content. In particular, there was concern that some entire subjects might be removed from the curriculum and that decisions to remove content would be based on 'political' rather than educational considerations.

The recommendation of the Review is to retain all existing mandated subjects in the early and middle years of school. In other words, the process of reducing content should occur within learning areas and subjects where this is judged appropriate, and through a reconsideration of extra-curricular topics and issues that schools have been asked to address, but not by eliminating entire subjects. In the primary years, the Review recommends adding language learning to the curriculum for all students, and in the senior years, reducing the number of subjects over time by combining and consolidating some subjects to produce a new set of subjects, each of which integrates theory and the application of theory in an area of learning. In the senior years, the intention is not so much to remove content from the curriculum as to repackage it as part of new, rigorous HSC subjects.

The Review is also clear about how the content of subjects should be reduced where this is judged necessary. The process should be to identify knowledge, skills and understandings that are central to the subject and upon which further learning in the subject depends. These should provide the core focus of learning. If content is to be removed, it should be more peripheral content not central to the development of deep understandings of key disciplinary concepts, principles and methods. This consideration should take precedence over all other considerations in reducing content.

Some questions related to the Review's recommendation that every student commence learning a second language during the primary years. This recommendation is based on evidence that language learning is more effective when commenced at younger ages and that it has wider benefits for learning. Having more school graduates proficient in a second language also will have broader benefits for society and the economy in an increasingly globalised world. However, in the absence of the required number of language teachers, it will not be possible to implement this recommendation without extensive use of technology of the kind already used in a number of countries to enable language teaching and learning in every classroom. A first step in the implementation of this recommendation should be to investigate how technology can be used to support the learning of languages in primary classrooms throughout the state.

Although there was good support for ensuring every student develops a sound understanding of Aboriginal cultures and histories as part of their schooling, there was concern that this could be 'tokenistic'. The Review's recommendation is that a curriculum be developed that clarifies what every student should know and understand about Aboriginal cultures and histories. The Aboriginal community should play the central role in the development of this curriculum, which should be incorporated into Human Society and its Environment. The recommendation is not to address Aboriginal cultures and histories opportunistically across the school curriculum, but to make this a mandated part of student learning based on an explicit curriculum taught and assessed in all schools.

Other questions related to the Review's observation that skills in applying knowledge are currently undervalued and under-developed in the school curriculum. This observation is based on the current content of most tests and examinations, particularly in the HSC; attempts to develop and assess 'general capabilities' separately from the content of school subjects; and the academic-vocational divide in the senior years of school. Some submissions were concerned that the Review's proposal that learning in every subject include a mix of theory and application could lead to less rigorous learning in some subjects. Those responsible for implementing the new curriculum will need to make clear that rigorous, high-quality learning involves more than being able to reproduce knowledge in an examination or to demonstrate a checklist of skills in a workplace. Deep disciplinary learning is reflected in the ability to transfer and apply knowledge to practical real-world settings, and the expert execution of skills depends on a sound understanding of the theory that underpins them.

The Review's recommendation that every student undertake a major investigative project in the final years of school is designed to ensure every student has a context in which they can develop and demonstrate skills in applying knowledge. Many students currently do not have this. Submissions to the Review identified challenges in implementing this recommendation. These include resource implications, challenges in authenticating the work of students presenting it, the need to ensure consistency of teachers' project assessments, and the possibility that projects will advantage students with superior access to resources. These are all legitimate – but probably not insurmountable – concerns. Some other school systems have addressed these concerns through constraints on the nature of projects, the required documentation of processes, and moderation procedures for ensuring consistency of judgements. The implementation of this recommendation will require the early investigation of practical ways to address these concerns.

Questions about the structure of the new curriculum

A feature of new syllabuses is that they are not tied directly to periods of time (stages or years of school). The reason for decoupling new syllabuses from time is the observation that many students currently are being forced to move from one year-level syllabus to the next simply because of the elapse of time and without mastering the content of the prior syllabus. The result is that they lack the foundations for what comes next and frequently fall increasingly far behind as year-level syllabuses become increasingly out of their reach. This is almost certainly a major explanation for the large percentage of students who complete school not having achieved even minimally acceptable standards of attainment. On the other hand, many students ready to move to more challenging material are often unable to advance because of the timed, lock-step nature of year-level syllabuses. The conclusion of the Review is that many students are not making the progress they could, and not achieving the levels of which they are capable, either because they are continually over-challenged by material for which they lack prerequisite foundations or under-challenged by material they have largely mastered.

It will be important in implementing the new curriculum to make clear that new syllabuses are similar to existing syllabuses except that: (1) they are less prescriptive and give priority to deep conceptual learning over comprehensive coverage of facts and procedures; (2) they give increased priority to developing students' skills in applying knowledge; and (3) they are not bound to defined time periods. Students who require more time to achieve the content of new syllabuses will have it; students ready to move to the next syllabus will be able to do so. Beyond those differences, new syllabuses, in common with existing syllabuses, form a sequence of learning units, each building on prior learning and laying the foundations for further learning. Together they provide a common path of learning to higher levels of knowledge, understanding and skill, along which every student is expected to progress.

Submissions to the Review raised a number of questions about how new syllabuses will work in practice. Some questioned whether the possibility of students in the same year of school working on different syllabuses at the same time implied an end to age-based classrooms. The Review does not assume or require an end to grouping students by age. Indeed, it believes there are sound social reasons for having students move through school with their age peers. The new syllabus structure is a response to the variability that already exists within each year level, and is designed to support teachers to establish where individuals are in their long-term learning progress and to better meet their current learning needs. Some schools may choose not to group students by age, but this is not a recommendation of the Review.

Some submissions also questioned whether the introduction of new syllabuses could lead to 'streaming'. This is not the Review's intention. The disadvantage of streaming is that it risks locking students into streams and labelling individuals as good or poor learners. In implementing the new curriculum, the intention should be to recognise that, within each subject, students are on the same path of learning but inevitably are at different points on that path at any given time. This is the idea that underpins other learning sequences, such as grades in music, language proficiency levels and proficiency levels in swimming. Some schools may choose to respond to students' varying levels of attainment and learning needs by teaching them in (temporary) groups, but the Review does not assume grouping and cautions against any grouping practices that might label students as inherently good or poor learners. Equally, it is not assumed that teachers will develop 'individual learning plans' for all students; the plan for each student's learning is made explicit in the syllabus on which they are currently working.

A question also was raised about the possibility of the new syllabus structure lowering expectations for some students. Implicit in this question appears to be the belief that it is 'fair' to provide every student of the same age with the same syllabus. But this belief confuses equity with equality. When students have very different needs, it is not fair to treat them equally; equity demands differentiated responses. Given the very wide variability in students' levels of attainment and learning needs in each year of school, to treat every student fairly, the new curriculum must be structured to support teachers to meet individuals' current learning needs. This is also a key to ensuring every student makes excellent ongoing progress in their learning and achieves at least a minimally acceptable standard by the completion of their schooling. The current practice of providing the same syllabus to all students of the same age is a contributor to the poor progress many students now make.

A number of submissions questioned whether new syllabuses might lead to 'over-assessment' and generate data that could be used for unintended purposes. The amount of day-to-day monitoring of student learning by teachers should be no different in the new curriculum from the existing curriculum. Teachers will need to make judgements about when students have achieved the syllabus on which they are working and are ready to move to the next. These judgements will be based on teachers' observations of student work, including via classroom tests and other assessment activities, as at present. Some teachers may choose to use externally provided assessment materials, also as at present. Judgements about when a student has achieved a syllabus should replace (rather than complement) current A to E grades. Given that most students are unlikely to progress through more than one or two new syllabuses in a school year, there is no reason why these new arrangements should lead to 'over-assessment'.

When a teacher judges that a student has 'achieved' a particular syllabus in the new curriculum, that decision should be recorded and used for internal school purposes, including reporting to parents/carers. But it is not intended that such decisions will be collected centrally. (The exception might be if a decision were made to report on the Higher School Certificate students' highest levels of attainment in mandated subjects.) It is the opinion of the Review that, if records of the kind envisaged were used for purposes other than a school's monitoring and reporting of individual attainment and progress, then those intended purposes could be undermined.

The Review is recommending not only the development of a sequence of new syllabuses in each mandated subject, but also the identification of the level of attainment every student should be expected to reach and ideally exceed by the time they complete school. Some submissions pointed out that, for a small percentage of students with disability, this level of attainment is likely to be unrealistic. In implementing the new curriculum it will be important to make clear that any minimum standard of this kind will be appropriate for the vast majority of students, but not for every student. Students with disability should be supported to engage in the common mandated curriculum, their learning progress should be monitored, and appropriate, personalised stretch targets should be set for their attainment.

Involve stakeholder groups, especially teachers, in all implementation phases of the new curriculum.

- Consult and actively involve all relevant stakeholder groups in the planning, development and pilot testing of new curriculum arrangements.
- Implement a communications plan to explain the urgency of curriculum reform and the key intentions, guiding principles and underpinning evidence base for the new curriculum, including by clarifying what is not intended.

Creating enabling conditions

The successful introduction of the new curriculum will depend on the creation of a number of enabling conditions, including increased time for teachers to focus on the priorities of the new curriculum; teaching, assessment and reporting practices aligned with the principles and intentions of the new curriculum; and professional capacity building to support schools' delivery of the new curriculum.

Time for teaching and learning

Many teachers who spoke with the Review described being under time pressure. Some commented that this made it difficult to teach important content in depth. Teachers described experiencing time pressure from a number of directions. Much of it arose from the amount of content in syllabuses. Teachers regularly described being under pressure to cover large numbers of specified 'dot points'. Some reported that the volume of content meant they moved quickly from one dot point to the next in an effort to cover everything, often skating across the surface of the curriculum in the process. This was not true of all syllabuses, including some recently redeveloped syllabuses, but a consistent comment from many teachers was that there was simply too much to cover in most syllabuses.

Some people questioned whether teachers were over-interpreting what was mandated in syllabuses and attempting to teach more than was necessary. There was speculation that some teachers were covering not only mandated content, but also material that was intended to be illustrative rather than essential. On the other hand, some teachers believed it was not always clear in syllabuses what was mandated and what was not. It was also suggested that many teachers worked in schools with a strong focus on compliance and so had become risk averse. Support for this suggestion came from some individual teachers' explanations that the reason they attempted to cover everything in syllabuses was to avoid their school being judged 'non-compliant' or their students being disadvantaged when they reached the Higher School Certificate. Whatever the explanation, many teachers described feeling under pressure to cover large amounts of syllabus content and described the outcome as a form of teaching that they themselves considered less than ideal.

In addition to concerns about the amount of content in some syllabuses were concerns about extra requirements imposed on schools by governments and school systems. Submissions to the Review listed a variety of topics that had been added to the work of schools in recent years in response to specific events, pressure from lobby groups, and government concerns about health and social issues not being addressed elsewhere. Schools pointed out that these issues were added with little or no consideration of their impact on the rest of the curriculum or the workload of schools. There was rarely any systematic evaluation of whether these additions achieved their purposes, and when new issues were added, nothing was removed.

A range of other recent developments were considered to have reduced teachers' time to teach the curriculum. These included external compliance requirements. There were numerous references to 'box ticking' and paperwork now required of teachers. A particular issue for some teachers was the amount of time spent on programming (lesson planning). The Review was shown examples of extensive documentation prepared by some teachers as part of their programming. It was explained that this documentation was required by principals so that it could be put on file in anticipation of visits by NESA inspectors. But according to some teachers, the required documentation did not always reflect what they did in practice.

The consequences of being under time pressure were identified as: reduced ability to slow down teaching and to reteach when necessary; less classroom time to develop students' deep understandings, including by explaining and illustrating the relevance and practical application of content; reduced ability to work with individual students to diagnose difficulties and to provide personalised teaching; and reduced opportunities to attend to student wellbeing and to support students with personal issues impinging on their learning. Increased teacher workload and stress also were identified as consequences of time pressures.

The development of new syllabuses that are less prescriptive, contain less factual and procedural content, and prioritise deep learning of essential facts, concepts and principles in each subject is one response to current concerns about time pressure. It is not envisaged that teachers will do less teaching under the new curriculum, but that they will be less focused on covering large amounts of material and will have more time and flexibility to develop students' understandings of content, including through opportunities to apply those understandings. Greater clarity about what is mandatory and what is not also will assist many teachers.

Beyond this, consideration should be given to ways of limiting the extra-curricular topics schools are asked to add to the school curriculum. A review should be undertaken of the requests that have been made of schools in recent years to determine whether all are still required, and protocols for adding such topics in the future should be developed and reviewed.

Efforts also should be made to reduce the amount of time teachers and school leaders now spend on paperwork and compliance activities. This should begin with a review of what is currently expected of teachers and schools to determine whether all existing requirements are necessary and whether some reduction in compliance activities is possible.

Review current external demands on teachers' and school leaders' time in an effort to maximise the time available for teaching, learning and instructional leadership

- Review recent requests that schools add extra-curricular issues and topics to the school curriculum to determine whether all are still necessary, and review protocols for adding such issues and topics in the future.
- Review current paperwork and compliance requirements of teachers and school leaders with a view to reducing the time currently spent on such activities. This review should be undertaken by NESA and each school sector.

An aligned learning 'system'

The successful introduction of the new curriculum also will depend on changes to other aspects of schooling to bring them into alignment with the principles and intentions of the new curriculum. These other aspects include, but are not limited to, approaches to classroom teaching, assessment and reporting, as well as broader approaches to improvement, including professional development, initial teacher education, performance monitoring and accountability. The new curriculum is envisaged as part of an integrated learning 'system' in which the components of the system are mutually supportive and reinforcing.

Efforts to improve outcomes in school education often are based not on an integrated system, but on isolated 'solutions'. For example, some governments and school systems have sought to achieve improvement by developing curricula that specify in great detail what every teacher should teach and every student should learn – from week to week, if not day to day. The assumption is that, if every student is taught the same tightly specified year-level curriculum, then outcomes should improve.

Other efforts to improve outcomes go further and specify not only what teachers should teach, but also how they should teach. This may include encouraging or requiring teachers to use particular teaching methods. These methods sometimes involve tightly scripted lessons. Again, the assumption is that by ensuring every teacher teaches the same curriculum in the same way to all students, outcomes should be improved.

Yet another strategy has been to allow teachers to decide how they will teach, but to hold teachers and schools accountable for improving student performance through centrally developed testing programs, public reporting of school results, and incentives for improved performance, either in the form of rewards or sanctions.

Although popular in the English-speaking world, and sometimes associated with temporarily improved test results, strategies of these kinds generally do not deliver deep and sustained improvements or world-class performances.⁷⁵

More recently, the study of countries that perform unusually well in international achievement surveys has shown that education systems are capable of promoting improvement and high performance through the overall conditions they create for teachers and schools.⁷⁶ There is evidence that high-performing countries create strong alignment of the various elements of their schooling systems, including the curriculum, examinations and other assessments, reporting processes, pedagogical practices, initial teacher education, teacher professional learning, school leadership, school organisation, education system support, and enabling legislation. In high-performing countries, these and other elements form an aligned learning 'system' underpinned by common principles.

Principles underpinning the new curriculum in NSW are outlined in Section 6. These principles, which also should underpin the broader learning system, highlight the importance of:

- **Promoting learning with understanding**
The new curriculum prioritises the development of deep understandings of subject content and the ability to transfer and apply those understandings. These priorities also should be promoted through other components of the learning system, including professional capacity building and assessment and reporting arrangements.
- **Establishing and understanding where individuals are in their learning**
The new curriculum is structured to support teachers to establish where students are in their long-term learning progress, to identify best next steps for teaching and learning and to monitor individual growth over time. This has implications for the assessment and reporting of student learning and for teaching.
- **Targeting individual learning needs with evidence-based teaching**
The new curriculum assumes that, once teachers have established where students are in their learning, they will teach students the syllabus appropriate to their current level of attainment and use effective, evidence-based teaching strategies to address current learning needs. This assumption has implications for classroom teaching and professional capacity building.

Given the significant influence that tests, examinations and other assessment processes have in directing teacher and student effort, it will be especially important that these are closely aligned to the intentions of the new curriculum.

The new curriculum's focus on learning with understanding means that assessment processes should value and provide information about how well students understand core concepts, principles and ways of thinking and working in a subject. This will be demonstrated in part by students' abilities to transfer and apply their understandings to relevant contexts and problems. The assessment of conceptual understanding generally requires open-ended tasks that allow students to demonstrate their level of understanding. Most tasks designed to assess the recall of information or the application of routines provide limited information about student thinking. For example, students can sometimes solve physics problems by identifying the appropriate formula, substituting numerical values correctly, and calculating the right answer, but still harbour fundamental misconceptions about the underlying physics (such as believing that if an object is moving there must be a force acting on it). The assessment of growth in conceptual understanding requires an appreciation of how student understanding typically evolves, as well as an appreciation of common student misconceptions.

The new curriculum's focus on integrating knowledge and skills means that assessments designed solely or primarily to test students' mastery of a body of knowledge provide an incomplete picture of student learning. The same is true of assessments designed solely or primarily to assess students' abilities to demonstrate a checklist of skills. To be consistent with the intentions of the new curriculum, assessments also must provide information about students' abilities to apply subject knowledge. Problem-solving activities and investigative projects can be useful contexts for gathering information about the depth of student understanding and for assessing skills in applying knowledge, such as critical and creative thinking, using technologies, communicating, and skills in working as part of a team.

⁷⁵ M Fullan, *Choosing the wrong drivers for whole system reform*, Seminar Series 204, Centre for Strategic Education, East Melbourne, Vic., 2011.

⁷⁶ Tucker, *Leading high performance school systems: lessons from the world's best*

In the new curriculum, every student progresses through a sequence of new syllabuses in each subject. The primary purpose of assessment is to monitor a student's progress in mastering the content of the syllabus on which they are working. This may include an analysis of gaps in a student's knowledge, skills and understandings and feedback to assist the student to address these gaps and work toward achievement of the syllabus. Teachers also then decide when a student has mastered the content of the syllabus and is ready to move to the next. This decision requires an on-balance judgement and may benefit from collaboration with other teachers.

Work to ensure all components of the learning system – including professional capacity building, assessment and reporting processes, and broader improvement efforts – are aligned with the principles and intentions of the new curriculum.

- Build a coherent system of support for the new curriculum's goals to promote learning with understanding; build skills in applying knowledge; and assist teachers to establish where students are in their learning so that individual needs can be addressed with appropriately targeted, evidence-based teaching.
- In assessing student learning, give greater priority to students' understanding of core facts, concepts and principles, ability to apply these understandings in relevant settings, and skills in knowledge application.
- Develop, implement and promote assessment and reporting practices to establish the points individuals have reached in their learning, to provide diagnostic feedback to support further learning, and to monitor students' long-term learning progress.

Professional capacity building

The successful implementation of the new curriculum depends on teachers understanding its intentions and having the requisite professional knowledge and skills for implementation.

Core to the new curriculum is its view of teaching as the process of establishing where students are in their learning and then ensuring individuals are taught new syllabuses appropriate to their current levels of attainment. Establishing where students are in their learning may include understanding backgrounds and starting points (for example, cultural/language backgrounds, motivations, interests, and specific learning difficulties).

This might be described as a 'teaching' mindset. It places students at the centre of the teaching and learning process and assumes that, while students may be at different points in their learning and may be progressing at different rates, every student is capable of making further progress if they can be engaged, motivated to make the required effort and provided with a well-targeted syllabus appropriate to the point they have reached in their learning and their current learning needs. The new curriculum assumes – and depends on – teachers bringing this mindset to their teaching.

It is possible to imagine a quite different mindset in which teaching is viewed only as a process of delivering a pre-specified syllabus to all students in the same year of school in the same way. This 'delivery' mindset places the syllabus at the centre of the teaching and learning process and is focused on content delivery rather than on identifying where students are in their learning and then tailoring teaching to learners' levels of readiness and learning needs.

The successful implementation of the new curriculum depends on other components of the learning system also being based on a 'teaching' mindset. For example, initial teacher education programs and ongoing professional learning should be based on recognition that teaching, at its heart, is about understanding where learners are in their learning and providing targeted teaching that challenges and extends learners to higher levels of attainment.

A teaching mindset needs to be accompanied by a teaching skill set.

First, teachers require a deep understanding of how knowledge, skills and understandings typically develop in an area of learning over an extended time period. This is an essential part of their pedagogical content knowledge. It is rarely adequate for a teacher's knowledge to be limited to a single year level because almost all teachers teach students at widely different levels of attainment. If teachers are to provide every student with appropriately challenging learning opportunities, then they usually require an understanding of the nature of learning and students' learning needs at widely differing stages of progress.

Teachers' appreciation of how knowledge, skills and understandings unfold in an area of learning can be enhanced by research. The findings of empirical learning research should be routine features of initial teacher education programs and ongoing professional learning, as well as informing sequencing in the school curriculum.

Second, teachers require skills in establishing and understanding the points individuals have reached in their learning. These skills usually are not the same as skills in assessing and grading students on how well they have learnt the content of existing year-level syllabuses. For example, for a student who is working well below the expectations for their year level, assessing how they perform on the year-level syllabus may provide few insights into the nature of the difficulties they are still experiencing. Such insights are likely to depend on assessments of earlier, foundational knowledge and skills and the diagnosis of gaps and misunderstandings in learning. Similarly, for a student who is performing well above the expectations for their year level, knowing how they perform on that syllabus may provide few insights into their actual level of attainment and what they are now capable of learning. To establish and understand where individuals are in their learning, teachers require a different approach to assessment and a different skill set.

These skills need to be developed through initial teacher education and ongoing professional learning and collaboration. The development of teachers' understandings of the nature of long-term progress in an area of learning needs to be accompanied by support in establishing and diagnosing where individual students are in their learning. Quality assessment resources can assist in this process, particularly if they are designed to support teachers in identifying students' levels of conceptual understanding and the quality of their thinking.

Third, having established where individuals are in their learning and identified the most appropriate new syllabus for each student, teachers need an understanding of effective, evidence-based teaching strategies and interventions. These understandings also need to be developed through initial teacher education programs and ongoing professional learning and collaboration.

Invest in professional capacity building to support the implementation of the new curriculum.

- Promote an understanding of teaching as the process of first establishing where students are in their learning and then providing stretch learning challenges appropriate to individuals' current levels of attainment.
- Develop and deliver professional learning to build teachers' skills in assessing and diagnosing student learning and their knowledge of effective, evidence-based teaching strategies.

Timeline for introduction

Early and middle years of school

Work should be commenced as soon as possible on the development of new syllabuses for English and Mathematics. It is proposed that syllabuses for these two learning areas be developed in parallel.

Figure 16 provides a timeline for the staged development, piloting and introduction of these new syllabuses. Work begins in the first year with the planning and development of four syllabuses appropriate to the early years of school. During the second year, these syllabuses are piloted and finalised for introduction into schools the following year, and work also begins on planning and developing the next set of four syllabuses. This process continues until all syllabuses are introduced in the sixth year.

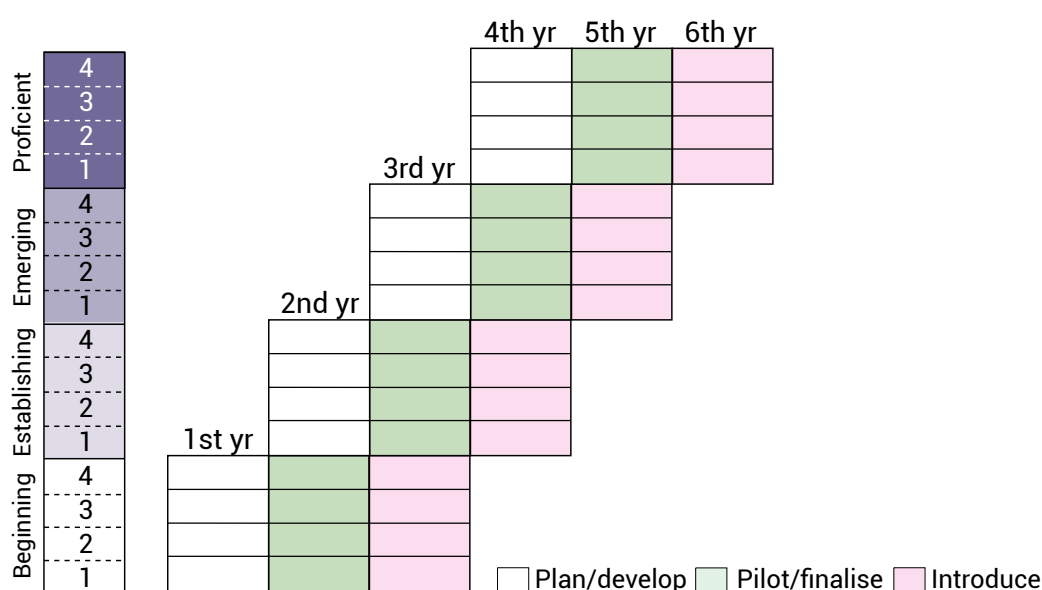


Figure 16 Timeline for developing, finalising and introducing new syllabuses

This timeline applies to each learning area, with syllabuses in Science and Human Society and its Environment being developed one year later than English and Mathematics, and work for other key learning areas commencing one year after that.

The development of every syllabus involves the same set of tasks:

- describe and illustrate how the syllabus further develops students' understandings of essential facts, concepts and principles of the learning area;
- focus the content of the syllabus on these core understandings and minimise the amount of more peripheral factual and procedural knowledge;
- incorporate into the syllabus opportunities for students to transfer and apply syllabus content to a range of relevant situations and problems;
- incorporate into the syllabus skills in applying knowledge (such as critical thinking, communication skills and skills in using technologies);
- specify what students should know, understand and be able to do as a result of the syllabus and illustrate this standard with samples of student performances and work;
- provide examples of teaching and learning activities that teachers could use to build students' mastery of the syllabus content;
- provide teachers with support, including online resources and professional learning, to diagnose student difficulties and misunderstandings; and
- provide teachers with guidance in deciding when students have achieved the syllabus (that is, met the identified standard) and are ready to move to the next.

In each learning area, consideration also will need to be given to the standard students are expected to reach by the completion of school. This will be the standard required to achieve Proficient Level 4 in Figure 16. Separate stakeholder conversations about the setting of this standard may be required.

If possible, new syllabuses should be developed in consultation with the national body responsible for reviewing the content of the Australian Curriculum (currently the Australian Curriculum Assessment and Reporting Authority). Joint work to identify essential facts, concepts and principles in each learning area is likely to be particularly beneficial. It will also be important to pilot new syllabuses in schools as they are being developed.

New syllabuses in the subject Human Society and its Environment should incorporate an explicit curriculum in Aboriginal cultures and histories. This curriculum should identify what every student should know and understand about Australia's first peoples, and this should be part of the mandated content of the learning area.

In the first two years of planning the new curriculum, work also should be commenced on scoping and confirming technology-based resources to support second language learning in primary schools, in collaboration with relevant language teacher associations. Once identified, this technology should be piloted before being made available to all schools.

Later years of school

In parallel with work to develop new syllabuses for the early and middle years of school, work should be commenced as soon as possible on the planning and development of new syllabuses for the senior years of school. The long-term agenda is to ensure every subject in the senior years promotes rigorous, high-quality learning based on the integration of theory and the application of theory, and in the process, to minimise (and ideally eliminate) the current academic-vocational dichotomy.

There are some immediate steps that should be taken. The first is to develop a new framework for learning in the senior years. This framework is designed to improve student pathways and consists of a set of newly defined 'learning areas' such as 'Mathematics and Sciences', 'Visual and Performing Arts and Entertainment' and 'Engineering, Construction and Manufacturing'. Work should be commenced immediately to define these new learning areas and every existing subject should then be allocated to one of these learning areas.

Consideration should then be given to how these new learning areas can serve as focal points for building stronger connections between schools and post-school education and training providers and relevant industries, and also for developing students' understandings of career possibilities and pathways into those careers.

Having developed this new framework for learning in the senior years of school, NESAs should begin a process of reviewing subjects within each learning area with a view to designing a set of rigorous, high-quality, future subjects, each of which integrates knowledge and skills, theory and practice. Some of these will be based on existing 'academic' subjects with a greater focus on how disciplinary knowledge can be applied. Others will be based on existing 'vocational' subjects with a greater focus on theoretical understanding. Still other subjects may be newly developed. In some learning areas, the total number of future subjects may be smaller than the number of existing subjects.

Work should then begin on developing these new subjects. A key task will be to consider how learning in each subject might be modularised to enable progress in the subject to be assessed and recognised, and to provide students with more flexibility to choose which and how many modules they complete. It is assumed that two years will be required to develop each subject, and a further year will be required to pilot the subject and finalise details before making it available to schools (see Figure 17). It is also envisaged that not all subjects would be developed in parallel, and that work on some would commence in later years, meaning that at least a decade may be required to develop and introduce the entire set of new HSC subjects.

In the first two years of planning the new curriculum, specifications should be developed for the major investigative project recommended by the Review. Key tasks here will be to decide on the size of the project (anticipated number of hours) and the essential features and requirements of the project. Early consideration will need to be given to processes for authenticating student work, ensuring fairness for all students, and assessing project work and moderating teacher assessments.

1st yr	2nd yr	3rd yr	4th yr	5th yr	6th yr	7th yr
<p>Define a set of new learning areas.</p> <p>Begin exploring how these will provide focal points for student pathways.</p>	<p>Within each newly defined learning area, plan and design a set of rigorous, high-quality future HSC subjects, each of which integrates theory and the application of theory.</p>		<p>Develop each new subject, focusing on core knowledge, skills and conceptual understandings; the integration of theory and practice; and the development of students' skills in applying knowledge.</p> <p>Design the subject as a set of modules that enable choice and the assessment and recognition of student progress.</p>		<p>Pilot the new subject in schools and finalise its details, including assessment processes.</p>	<p>Introduce the new subject into schools.</p>

Figure 17 Timeline for developing, finalising and introducing new syllabuses in the senior years

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